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Virginia Medical Monthly

OFFICIAL ORGAN OF THE MEDICAL SOCIETY OF VIRGINIA

Fifty-fourth Annual Meeting, Roanoke, October 16-19, 1923.

Vol 50, No. 5.
WHOLE No. 854.

RICHMOND, VA., AUGUST, 1923

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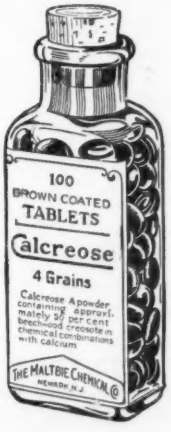

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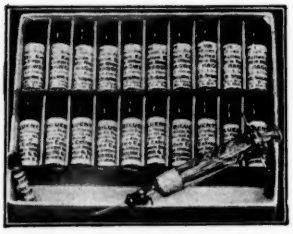

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Original Communications

THE TREATMENT OF LOBAR PNEUMONIA.

By RUSSELL L. CECIL, M. D., New York City.

In the treatment of lobar pneumonia we are governed by the same general principles that apply to the treatment of all serious infections. These principles have to do with rest, ventilation, proper diet, catharsis, and the control of various symptoms as they arise.

Rest is particularly important in the treatment of pneumonia. Too much physical examination, having the patient sit up in bed, and other such procedures are not only bad for the heart, which is already under strain, but may be responsible for the spread of the disease into other lobes. Since death in pneumonia is generally due to extension of the disease, everything should be done to limit the infection to the original lobe, and complete rest and quiet are important factors in achieving such a result. It is very important for the patient to get plenty of sleep, and the physician should not hesitate to employ codeine or morphine for this purpose.

Proper ventilation is very important for the pneumonia patient. Anoxemia is a common symptom in pneumonia and can be combated in part by a generous supply of fresh air. There is still difference of opinion as to whether pneumonia patients should be put out on balconies when the temperature is freezing. Perhaps it is better not to be dogmatic on this subject, but to use the fresh air treatment when the patient wishes it and when he feels better out doors. It is generally agreed that cold air is injurious in broncho-pneumonia, particularly the type following measles.

The diet in pneumonia should be liquid, but the choice of articles may be left in large part to the taste of the patient. A limit, of course, must be put on carbohydrates, as an excess of sugar would tend to produce tympanites. For the same reason, I am opposed to a high calory diet in pneumonia. Pneumonia runs a short course, and a high calory diet is entirely unnecessary. It is most important that patients with pneumonia should drink large amounts of water, particularly if they have a high temperature, or appear toxic.

The bowels are best regulated by salts and daily enemas. In many cases enemas alone are not sufficient to prevent distention and even with the addition of Epsom salts by mouth the distention may become so great that turpentine stupes are necessary. Magnesium sulphate is probably the best of the various mineral salts and should be given in fairly large doses.

Pain in the side is best controlled by codeine administered every two or three hours, either by mouth or subcutaneously. In cases where the pain is very severe, morphine should be used without hesitation, not only to relieve the pain, but to give the patient rest and sleep. The drug treatment may be supplemented by hot poultices and by strapping with adhesive plaster if necessary. The last procedure interferes somewhat with the examination of the patient and should be avoided if possible.

Cough is often a very distressing symptom in pneumonia, and here again we must depend on codeine and morphine not only to control the cough but to give the patient opportunity for sleep. When the sputum is extremely viscid, ammonium chloride may be administered with advantage.

Stimulation in some form or other is usually desirable in the course of pneumonia and the most popular cardiac stimulant at the present time is digitalis. A good tincture is usually easiest to obtain and should be given in fairly large doses at the outset. (1 dram, b. d). On the second day the dosage may be cut to 20 mms. t. i. d. In cases of emergency, ouabin, one-half mg., may be administered intramuscularly. As much as two and one-half mg. may be administered within twenty-fours hours. This is a very powerful stimulant, but in most cases where cardiac failure has set

in we have found that the benefit derived from cardiac stimulation is only temporary at best. Alcohol is still used by some good clinicians, but the trend of opinion seems to be against its use in pneumonia. Camphor, strychnin and caffeine may also be employed, but probably have very little therapeutic value.

Serum Treatment. I believe that Type I anti-pneumococcus serum is of benefit in pneumococcus Type I pneumonia, when administered early in the disease and in large doses. This form of treatment, however, has not proved to be altogether practical for the general practitioner. The chief reason for this is the difficulty and delay connected with the proper typing of sputa. The statistics reported from the Rockefeller Institute by Cole and his co-oworkers showed a death rate of only 7.5% in cases of Type I pneumonia which had been treated with serum, whereas the control cases ran a death rate of 25%. Recent reports from other hopsitals, however, do not show such a striking difference. In the first place, the death rate for untreated Type I pneumonia appears to lie between 20 and 25%, depending on the season, etc. Dr. Edwin A. Locke, of Boston, recently collected a large series of Type I cases which had been treated with Type I anti-pneumococcus serum in various hospitals where the records were accurate and the treatment had been faithfully carried out. In Dr. Locke's series there was practically no difference in the death rate between treated and untreated cases, except in a comparatively small group which had received serum treatment early in the disease. In the cases treated early the death rate was only about 9%.

During the last two years we have been working with a modified anti-pneumococcus serum at Bellevue Hospital. This preparation was first worked out by F. M. Huntoon, and is nothing more than a water solution of the immune bodies originally contained in polyvalent anti-pneumococcus serum. By a very ingenious procedure, Huntoon was able to extract the immune bodies from the anti-pneumococcus serum and redissolve them in water. This product is known as pneumococcus antibody solution and contains protective substances against pneumococcus Types I, II, and III.

The advantages of this preparation are:

1. It is polyvalent; that is, it is aimed against the three fixed types of pneumococcus, and according to our figures it has shown itself to be of distinct value in the treatment of Type IV pneumonia. By reason of its polyvalent character, typing of the sputum is no longer absolutely necessary, and treatment of the patient can be instituted as soon as the diagnosis of lobar pneumonia has been made. This, of course, is a great advantage over serum.

2. Pneumococcus antibody solution is practically free from horse proteins, hence there is no danger of anaphylaxis or serum sickness. This removes a great source of worry for the physician and discomfort to the patient, and there is, therefore, no reasonable limit to the amount of antibody solution that can be administered.

3. Pneumococcus antibody solution contains a certain amount of pneumococcus protein which may conceivably act in the capacity of a vaccine.

4. The fact that the preparation is a water solution renders it very soluble and easy to absorb and possibly presents the immune substance to the body in a form more acceptable than that of serum.

The antibody has usually been administered intravenously in doses of 50 to 100 cc., the technique being similar to that of serum administration. Injections are given once or twice, sometimes three times a day. The reaction produced by antibody is very characteristic and striking. In 20 to 40 minutes after the injection the patient usually begins to shiver and is soon in the midst of a hard chill, which lasts from 15 to 20 minutes. At its conclusion the patient complains of fever and the temperature may have risen to 106° F., or even to 108 or 109. This high temperature usually persists for only a short time, 30 to 60 minutes. The rapid fall is accomplished by a profuse perspiration, which may continue for several hours. The fall in temperature may be slight, but is often extensive, amounting to 8 or 10 degrees. It may be temporary or permanent, depending on the stage of the disease. These reactions are very similar to the so-called "foreign protein" reaction, and are probably due to a disturbance in the colloid equilibrium of the blood. The dose of antibody administered does not bear any close relation to the character or severity of the re-

action. In one patient 10 cc. may produce a severe chill, while another patient may tolerate 100 cc. without any reaction whatever. The reactions are more severe when treatment is started late in the disease.

During the past two and a half years this solution has been tested on a large scale in the wards of Bellevue Hospital. Through the kind co-operation of the various directors all cases of lobar pneumonia admitted to the twelve medical wards were studied bacteriologically, and on six of the twelve wards practically every case of lobar pneumonia was treated with intravenous injections of pneumococcus antibody solution. The other six wards were used as control wards. In these wards patients with pneumonia received no antibody but in other respects were treated in practically the same way as the patients who received antibody. Specific treatment was started as soon as the diagnosis of pneumonia was made. The result of the experiment are shown in Table I.

TABLE I.

COMPARISON OF DEATH RATE IN TREATED AND CONTROL SERIES.

	Cases Treated with Antibody			Control Cases		
Type	Cases	Deaths	Rate%	Cases	Deaths	Rate%
Pneumococcus I	157	21	13.4	175	41	23.4
Pneumococcus II	78	22	28.2	76	31	40.7
Pneumococcus III	57	20	35.	60	24	40.
Pneumococcus IV	109	17	15.6	137	31	22.8
Total	401	80	19.9	448	127	28.3
Strep. Hemolyt.	21	10	47.6	21	9	42.8
Strep. Viridans	7	1	14.2	10	1	10.

It will be observed that 401 cases of pneumococcus pneumonia were treated in the antibody wards, and 448 in the control wards. There was considerable difference in the mortality rate for Type I cases, 13.4 per cent. for the 157 treated cases, as compared with 23.4 per cent. for the 175 untreated cases. In the Type II groups the treated cases showed a death rate of only 28.2 per cent., as compared with the control death rate of 40.7 per cent. In the Type III series, the percentage of fatalities was more nearly the same for the two groups, 35 per cent. for the treated; 40 per cent. for the untreated cases. Strangely enough, a considerable difference in mortality rate was noted in favor of the treated Type IV group, 15.6 per cent. against 22.8 per cent. Altogether the treated pneumococcus cases showed a death rate of 19.9 per cent., while the control pneumococcus series represented a rate of 28.3 per cent. Streptococcus pneumonia was not benefited in the least by antibody treatment. In fact, the death rate was higher for the treated series (39.3 per cent.) than it was for the untreated series (32.2). The number of cases, however, in the streptococcus group is too small to permit of accurate conclusions.

TABLE II.

DEATH RATES FOR PNEUMOCOCCUS PNEUMONIAS RECEIVING ANTIBODY ON OR BEFORE THIRD DAY OF DISEASE. CONTROL SHOWS DEATH RATE FOR PNEUMOCOCCUS PNEUMONIAS ADMITTED TO CONTROL WARDS ON OR BEFORE THIRD DAY OF DISEASE

	Caes Treated with Antibody			Control Cases		
Type	Cases	Deaths	Rate%	Cases	Deaths	Rate%
Pneumococcus I	56	5	8.9	68	16	23.5
Pneumococcus II	24	5	20.8	25	8	32.
Pneumococcus III	10	1	10.	19	7	36.8
Total	90	11	12.2	112	31	27.6
Pneumococcus IV	24	4	16.6	45	11	24.4
Total	114	15	13.1	157	42	26.7

The results of treatment with antibody were much more striking in cases that were treated early in the disease. For example, in Table II it will be noticed that the death rate for Type

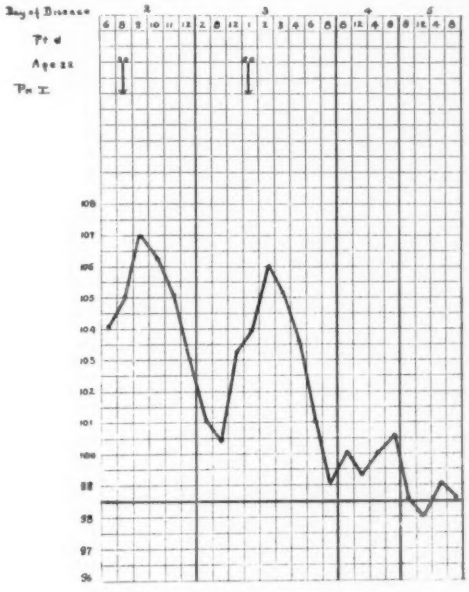

Fig. 1. Temperature Chart of Pneumococcus Type I Pneumonia.

I pneumonias treated during the first 48 hours of the disease was only 8.9 per cent., while controls admitted to the hospital during the first 48 hours of the disease showed a death rate of 23 per cent. Similar reductions are

noticed in the other types. Altogether, 114 pneumococcus pneumonias treated with antibody during the first 48 hours of the disease showed a death rate of only 13.1 per cent.; whereas 157 pneumococcus pneumonias in the control series ran a death rate of 26.7 per cent., more than twice as high.

Figure 1 shows the temperature chart of a Type I pneumonia treated with antibody. The case was that of a young man, aged 22, who came in with a consolidation of the right lower lobe. Antibody was given on the second day of the disease, 50 cc. intravenously. Following the injection, there was a rise of 3 degrees in the patient's temperature, followed by a characteristic fall. On the following morning the temperature rose to 104°, and another injection of antibody was given. This injection was also followed by a reaction with a fall of temperature to normal, where it remained. Figure 2 shows a Type II pneumonia treated with antibody solution, with reactions and results similar to those in the Type I case. Figure 3 shows a Type III case; Figure 4 a Type IV infection treated with antibody solution.

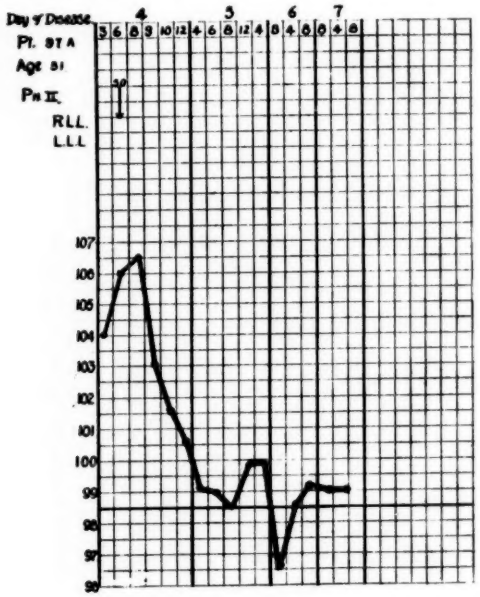

Fig. 2. Temperature Chart of Pneumococcus Type II pneumonia.

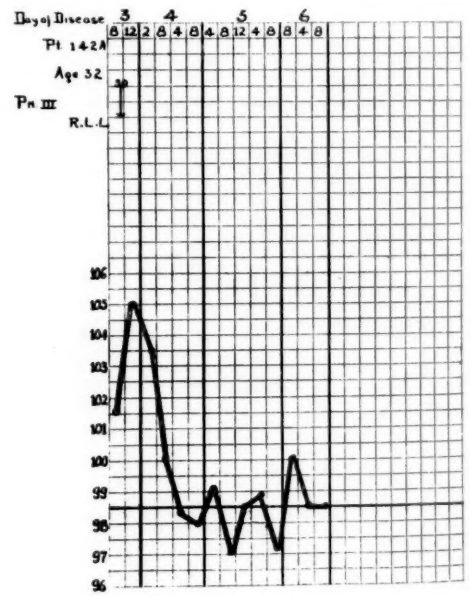

Fig. 3. Temperature Chart of Pneumococcus Type III pneumonia.

It is difficult to explain why Type IV pneumonia should be favorably influenced by pneumococcus antibody solution, as this agent is not supposed to contain any immune substance against Type IV pneumococcus. Evidence is accumulating, however, to show that pneumococcus Type IV is made up of atypical fixed types; in other words the Type IV strains represent aberrant forms of Types I, II or III. If this hypothesis is correct, it would readily explain the beneficial effect of antibody on Type IV pneumonia.

Upon the evidence which has been presented we must conclude that pneumococcus antibody solution is a therapeutic agent of considerable power. The effect is most striking when the antibody is administered early in the disease, but it may also be of value in the later stages by neutralizing the circulating toxins. The most dramatic effects are observed in Type I infections, but good results can also be obtained in the other types when antibody is used early and in large doses.

More recently we have been studying the effect of antibody when administered subcutaneously. By this procedure, one avoids entirely the severe reactions which are often very uncomfortable and, in certain cases, actually dangerous to the patient. It has been claimed, of course, that foreign proteins have therapeutic value in pneumonia and other infectious diseases. There is little evidence in our studies to support such a theory in respect to pneu-

monia. In the streptococcus pneumonias treated with antibody the death rate was higher in the treated cases than in the untreated cases. The proper time to administer the specific agent in pneumonia is during the first twenty-four hours of the disease. When antibody is given within twenty-four hours

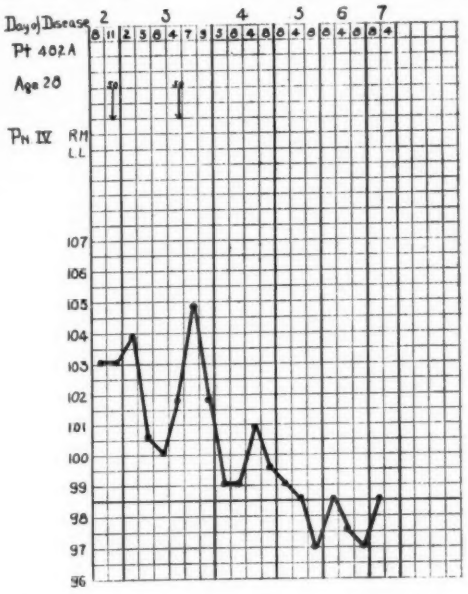

Fig. 4. Temperature Chart of Pneumococcus Type IV pneumonia.

after the chill, an aborted form of the disease is often produced, with the temperature going down to normal on the third or fourth day.

Contraindications to the intravenous injection of antibody are:

1. Cases complicated by severe systemic disease—cardiac, renal or vascular.

2. Cases seen late in the disease, when the patient's strength is well-nigh exhausted by the infection.

3. Pneumonia in the aged.

There is, of course, no contraindication to the subcutaneous administration of antibody, as it produces no constitutional reaction. The advantages of antibody, as already mentioned, are:

1. Its polyvalency, which makes it amenable for the treatment of all types and eliminates the necessity of typing the sputum.

2. Its freedom from horse protein and the danger of anaphylaxis and serum sickness.

3. The fact that it is water-soluble and readily absorbed when injected subcutaneously.

This preparation is still a new remedy and will certainly be subjected to further improvements as time goes on. A method must be devised for still further concentrating the antibody, and it would also be desirable to eliminate the shock reaction which follows the intravenous injection. Even in its present form, however, pneumococcus antibody solution marks an important step in advance in the specific treatment of pneumonia, and I believe that it will be along this line that an efficient mode of treating this disease will ultimately be worked out.

33 *East Sixty-first Street.*

SOME SOURCES OF ERROR IN THE INTERPRETATION OF THE PHTHALEIN TEST, WITH SPECIAL REFERENCE TO THE EFFECT OF EXERCISE.*

By WILLIAM H. HIGGINS, M. D., Richmond, Va.

Sufficient time has elapsed since the introduction of the phenolsulphonephthalein test by Rowntree and Geraghty to classify it among our most reliable diagnostic methods. Its absorption and excretion have been so thoroughly studied and verified by numerous observers that it is now universally accepted as the most accurate and practical of all the functional kidney tests so far proposed.

However, in spite of its unsurpassed value in renal diagnosis, startling discrepancies occur with sufficient frequency to warrant an inquiry into the factors concerned in the mechanism of the test. These factors may arise in part through carelessness in technique. In many instances the administration of the dye is left to a nurse or technician and there may be some doubt as to the exact amount given or whether the injection was made intramuscularly or subcutaneously. Any laboratory method which is as free from complicating steps as the one under discussion is likely to suffer because of its simplicity from apparently unimportant but in reality damaging alterations in its application. In the light of knowledge brought out subsequent to the introduction of this test, we must also consider the more deeply hidden agencies involved in tissue chemistry in their relation to absorption and excretion.

In the earlier studies by Rowntree and Geraghty, and more recently by Braasch and

*Read before the Richmond Academy of Medicine and Surgery, Richmond, Va., November 30, 1922.

Kendall, the influence of various conditions on the elimination of the dye were pointed out. Although these observations are more or less familiar, their practical bearing on the amount of phthalein excreted in a given period may bear repetition at this time. These factors are of particular importance where the clinician finds variations in the functional output of the kidneys in successive readings and is in doubt as to their significance.

The Influence of the Role of Absorption on the Rate of Excretion.

Meltzer and Auer[1] were the first to demonstrate that absorption from the intramuscular tissue is much more rapid than that from the subcutaneous tissues. According to these investigators, rapidity of absorption from intramuscular injection is dependent not on the puncture of small veins in the muscles as held by others, but is due to the direct absorption through the walls of the blood vessels.

Following this work, Rowntree and Geraghty[2] showed by carefully controlled animal experiments and verified clinically that absorption for one hour from the subcutaneous tissues averages 5 to 10 per cent less than from the intramuscular, while at the same time considerable variation (37 to 62 per cent) existed in the absorption from the same dog. On account of these large variations, due apparently to tardiness of absorption, this method was subsequently discontinued. They accordingly investigated the intramuscular method (gluteal and lumbar) and found an average of 51 per cent elimination during the first hour by the gluteal route as compared with 57.5 per cent when the injection was made in the lumbar region. Intravenously the output of dye for the first hour averaged 67.9 per cent., considerably higher than that from other methods of administration. By studying the curve of excretion for 5 and 10 minute intervals it was found that from 30 to 35 per cent is excreted in the first 10 minutes after appearance, this being half the total excretion for one hour. The striking rapidity of elimination in the first few minutes following intravenous injection results, of course, from the concentration of the drug in the circulation. Their conclusion was that the intravenous method is not as accurate as the intramuscular, especially where ureter collectors are employed. The normal variations in the functioning power for such short periods as 15 minutes or one-half hour are too great for accurate readings. In view of these studies they considered the intramuscular injection in the lumbar region the most desirable mode of administration.

Emphasis has been made on this point in technique as failure to take cognizance of these observations unquestionably introduces a source of error in the results.

The influences controlling the absorption from the site of injection are not entirely clear. It has been observed at the Mayo Clinic that in patients with urinary obstruction of long standing who were being prepared for operation the phthalein return by intramuscular injection was frequently lower than other clinical data would indicate. When the dye was given intravenously, the output was often nearly normal. This was particularly marked in patients undergoing preliminary treatment for prostatectomy, who were suffering from the reaction following drainage.

Factors Influencing Absorption and Excretion.

More recently a clinical investigation of the phthalein test has been made by Braasch and Kendall[3] at the Mayo Clinic. They make the inquiry whether in all cases of low phthalein output, the kidney is the only factor involved. If conditions should exist in the body whereby the injected phenolsulphonephthalein is absorbed and retained in transit to the kidney, this action might result in delaying or indefinitely holding up a certain amount of the dye, so that the problem is not only one of whether the kidney can or can not excrete it, but whether or not the kidney has a chance to excrete it. Acting upon these premises, they showed first that the type of food and the capacity of each animal to carry out the reactions occurring in the metabolism of sugar and amino acids are among the factors determining the output of phenolsulphonephthalein. They pointed out also that although the body as a whole eliminates the dye to a high degree, tissues other than the kidney have some upper and lower limits of saturation which must be satisfied before the kidney even begins to excrete it.

It is known, of course, that a small part of the phthalein is eliminated through the bile ducts, but to what extent and under what conditions the liver may act as a storehouse for

the dye is not clear. Besides the question of the mere retention of phenolsulphonephthalein in the body, it can be shown experimentally that it is actually destroyed in the body tissues in the absence of oxygen. This destruction within the tissues not properly oxygenated is rapid and complete. Braasch and Kendall undertook to determine to what extent the destruction may take place clinically. Their results indicated that only in very marked cyanosis is the dye destroyed and, if the patient is able to be up, it is doubtful whether destruction of the dye within the tissues plays a very important part in the lowered ouput.

In investigating the possibility of the retention of the dye in tissues other than kidneys, it was shown by Kendall that if the tissues of dogs are rendered alkaline, phenolsulphonephthalein will be more readily given up. Clinically, it was found that after alkalinization of the urine, the phthalein output was increased from 10 to 50 per cent, largely in patients suffering from urinary obstruction or renal infection; in other words, when the impairment in renal function was temporary and dependent on these factors. If, however, the impairment was permanent, as in advanced chronic nephritis, little difference was found in the output following the administration of an alkali.

The condition of the circulation of the blood may also influence the excretion of the dye. In cardiac insufficiency, the functional output may be greatly reduced although the kidneys may show only minor changes. This low output may be explained by delayed absorption as the phthalein return intravenously is much higher than when given intramuscularly. The effect of diuretics may be mentioned briefly. Rowntree and Geraghty carried out extensive experiments with various kinds and their conclusions were that only those drugs which exert their effect on the renal secreting cells increase slightly the phthalein output.

Effect of Exercise on the Phthalein Output.

After giving the usual instructions to patients upon whom the phthalein test is being carried out, the question is frequently asked, to what extent is exercise permissible? I took occasion about one year ago to search rather carefully through the voluminous literature for any reference to this point, but without avail. In a personal communication from Dr. Geraghty, he stated that so far as he knew no effort had been made to determine the effect of exercise on the excretion of the dye.

The difficulties of determining this point are obvious. Aside from the influence of one or more of the sources of error referred to in this paper, it must be remembered that there are rather wide variations within the normal limits. Consequently, any comparative results can at best show only the general tendency of the renal function during a period of rest as following exercise.

Although the total number of observations is too limited in this preliminary report to draw definite conclusions, the patients were selected with considerable care in order that sources of error might be reduced to a minimum. No patient was examined whose illness was likely to fluctuate during the period of testing and no one showing evidences of any enlarged prostate was included. The phenolsulphonephthalein was administered and determinations were made according to the usual technique described by Geraghty.[4]

The patients' records are grouped on the two charts according to the degree of exercise. Those on Chart I refer to healthy students, and patients at the City Home Hospital, where the opportunities for exercise were unusually good. The nine students included in this test actually walked continuously during the two-hour period with the exception of the few minutes necessary at the end of the first hour to collect the specimens. The others were either nurses on duty, or patients who were cooking, cleaning, etc., during the test.

On Chart II is the record of observations taken at the Memorial and St. Philips Hospitals, where the exercise consisted largely of walking and sitting in the wards.

Of the twenty-one patients recorded on Chart I, sixteen gave lower readings after exercise, three showed higher readings and two gave the same for both periods. It should be added that one of the three secreted an alkaline urine and gave an abnormally high reading (90 per cent) after exercise. According to Braasch and Kendall, the soda which she was in the habit of taking introduced a source of error. Studied collectively, this group excreted on an average of 6 per cent less dye after exercise.

Of the twenty-two patients recorded on Chart II eight showed a decrease after exer-

CHART I.

Case	Absolute Rest 1st Hour	Absolute Rest 2nd Hour	Absolute Rest Total	Vigorous Exercise. 1st Hour	Vigorous Exercise. 2nd Hour	Vigorous Exercise. Total	Diagnosis
1.	400cc. 17%	800cc. 45%	62%	40cc. 45%	35cc. 17%	62%	Normal
2.	400cc. 37%	400cc. 36%	73%	210cc. 37%	200cc. 20%	57%	Normal
3.	380cc. 55%	180cc. 7%	62%	90cc. 43%	100cc. 10%	53%	Normal
4.	730cc. 62%	325cc. 7%	69%	25cc. 45%	20cc. 5%	50%	Normal
5.	240cc. 60%	275cc. 7%	67%	115cc. 33%	40cc. 22%	55%	Normal
6.	575cc. 65%	230cc. 7%	72%	250cc. 55%	150cc. 17%	72%	Normal
7.	480cc. 30%	500cc. 25%	55%	30cc. 60%	15cc 7%	67%	Normal
8.	200cc. 52%	100cc. 18%	70%	75cc. 35%	50cc. 32%	67%	Normal
9.	400cc. 35%	100cc. 22%	57%	40cc. 32%	70cc. 23%	55%	Normal
10.	120cc. 25%	80cc. 15%	40%	80cc. 20%	140cc. 15%	35%	Ch. Hypertension
11.	160cc. 30%	125cc. 22%	52%	110cc. 20%	80cc. 15%	35%	Arteriosclerosis
12.	300cc. 28%	240cc. 18%	46%	175cc. 42%	110cc. 15%	57%	Gonorrhea
13.	290cc. 27%	233cc. 18%	45%	125cc. 10%	100cc. 15%	25%	Gonorrhea
14.	300cc. 45%	240cc. 25%	70%	280cc. 75%	80cc. 15%	90%	Gonorrhea
15.	180cc. 45%	140cc. 35%	80%	90cc. 38%	60cc. 30%	68%	Pregnancy
16.	200cc. 45%	110cc. 30%	75%	95cc. 35%	40cc. 30%	65%	Pregnancy
17.	150cc. 35%	140cc. 20%	55%	100cc. 30%	70cc. 20%	50%	Var. Ulcers.
18.	230cc. 50%	160cc. 35%	85%	120cc. 45%	95cc. 30%	75%	Normal
19.	180cc. 42%	125cc. 30%	72%	95cc. 30%	70cc 25%	55%	Normal
20.	350cc. 45%	200cc. 40%	85%	160cc. 45%	140cc. 30%	75%	Normal
21.	200cc. 35%	200cc. 20%	55%	90cc. 30%	78cc. 22%	52%	Syphilis

cise, twelve gave an increase after exercise and two were the same for both periods. In this group there was an average of 3 2-3 per cent. increase after moderate exercise as compared with the 6 per cent decrease after rather vigorous exercise.

According to these two series of observations, there appears to be a difference between the functional output of the kidneys following moderate exercise and that following vigorous exercise. In the former series, there was no definite trend in the variations between the two periods and apparently the type of exercise taken by those recorded in Chart II, had no appreciable effect on the excretion of the dye.

In Chart I, however, the phthalein return showed a general tendency to be less after vigorous exercise in sixteen of the twenty-one studies, while two of the others remained the same.

An explanation of this probable influence of vigorous exercise on the output of phthalein is not altogether clear. We, of course, know that not infrequently a transient albuminuria, together with casts, occurs following strenuous exercise, but it has not been our experience to find evidences of renal irritability after the type of exercise described in these experiments. It is conceivable that other urinary solids are temporarily withheld by the kidneys following vigorous exercise. So far as I have been able to ascertain, no one has published any data bearing on the effect of exercise on the excretion of urea, sugar, creatinine, etc. We are now conducting experiments covering this point.

Conclusions.

I. The phenolsulphonephthalein test is an index of tissue absorption and retention as well as renal excretion. Any deviation from

CHART II.

Case	Absolute Rest 1st Hour	Absolute Rest 2nd Hour	Absolute Rest Total	Moderate Exercise 1st Hour	Moderate Exercise 2nd Hour	Moderate Exercise Total	Diagnosis
1.	175cc. / 20%	150cc. / 40%	60%	150cc. / 20%	200cc. / 35%	55%	Post Typhoid
2.	125cc. / 20%	200cc. / 35%	55%	100cc. / 15%	175cc. / 40%	55%	Post Typhoid
3.	150cc. / 20%	110cc. / 20%	40%	165cc. / 20%	100cc. / 35%	55%	Cardio Renal
4.	135cc. / 20%	175cc. / 40%	60%	155cc / 35%	125cc. / 40%	75%	Tuberculosis
5.	110cc. / 30%	75cc. / 35%	65%	175cc. / 30%	110cc. / 40%	70%	Puerperium
6.	110cc. / 30%	125cc. / 35%	65%	110cc. / 35%	75cc. / 30%	65%	Malaria
7.	100cc. / 20%	112cc. / 40%	60%	125cc. / 35%	125cc. / 40%	75%	Puerperium
8.	75cc. / 20%	125cc. / 20%	40%	110cc. / 30%	100cc. / 40%	70%	Puerperium
9.	100cc. / 25%	80cc. / 35%	60%	90cc. / 35%	110cc. / 35%	70%	Puerperium
10.	400cc. / 30%	400cc. / 25%	55%	60cc. / 40%	50cc. / 20%	60%	Var. Ulcer
11.	100cc. / 30%	750cc. / 27%	57%	100cc. / 30%	80cc. / 25%	55%	Tuberculosis
12.	350cc. / 50%	300cc. / 5%	55%	280cc. / 65%	100cc. / 5%	70%	Ch. Hypertension
13.	150cc. / 40%	500cc. / 25%	65%	150cc. / 30%	170cc. / 27%	57%	Tuberculosis
14.	250cc / 60%	200cc. / 20%	80%	250cc. / 35%	400cc. / 15%	50%	Fract. Radius
15.	150cc. / 40%	500cc. / 25%	65%	150cc. / 30%	170cc. / 27%	57%	Tuberculosis
16.	27%	22%	49%	40%	7%	47%	Cataract
17.	20%	20%	40%	30%	22%	52%	Syphilis
18.	50%	20%	70%	50%	17%	67%	Pregnancy.
19.	30%	15%	45%	12%	18%	30%	Pregnancy.
20.	30%	27%	57%	70%	3%	73%	Gonorrhea
21.	22%	47%	69%	50%	17%	67%	Gangrene of Toe
22.	7%	15%	22%	22%	17%	39%	Var. Ulcer.

the normal in these processes will show a corresponding change in the total elimination.

II. Its output is not materially influenced by moderate exercise, but after vigorous exercise, there is a definite reduction of the dye as compared with the amount excreted following absolute rest.

III. The recognition of certain sources of error is essential to a proper interpretation of the test.*

Professional Building.

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*I wish to acknowledge the valuable assistance of Dr. Joseph T. Graham at the City Home Hospital and the laboratory techincians at the Memorial Hospital in the preparation of this paper.

SOME UNSOLVED PROBLEMS IN NEUROLOGICAL SURGERY.*

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The title of this paper implies that there are some problems in neurological surgery that have been solved, but when I say solved I do not mean that every phase of those subjects has been cleared up and settled, for it will always remain one of the great charms of our profession that practically everything is still in a state of flux. Our most cherished theories of but a few years ago have to be discarded. Neurological surgery has been developed in such very recent times that many of the views its exponents hold have not been sufficiently tried and tested to make them as positive as some of the fundamental theories of, for example, bacteriology.

The treatment and permanent cure of major trigeminal neuralgia (tic douloureux) we do

*Read before the Richmond Academy of Medicine and Surgery, March 27, 1923.

understand, and these pathetic cases can be promised permanent relief by severing the sensory root of the fifth nerve from its origin in the pons. No case of tic douloureux that has had this operation done properly ever gets a return of pain. If the pain remains, the operation has not been completely done or the diagnosis was wrong; and we know now that pains occur in the face which are not true trigeminal neuralgia. But of the pathology of the disease we know nothing. There is no demonstrable pathological lesion, and the disease may be due to some physiological or chemical disturbance, or mayhap it is due to one of those greatly overworked causes, vitamines, ions or ductless glands. While the treatment of spinal cord tumors is perfectly clear and their removal is comparatively simple, the diagnosis and localization still offer many pitfalls, but of this I shall speak later. The treatment of certain types of brain tumor, the benign encapsulated endotheliomas, is also quite clear though here, too, both the diagnosis and treatment offer many difficulties.

But of the subjects that constitute our unsolved problems the following are a few:

The treatment of gliomas of the brain, of hydrocephalus, of mental deficients, and certain types of spastic cases both of cerebral and spinal origin. I shall, of course, not attempt to take up all these subjects, but shall confine my remarks to but three of them—the gliomas, hydrocephalus and spinal localization.

Forty-five to fifty per cent. of all brain tumors are gliomas. Gliomas are usually considered malignant tumors. Were this so, the problem would indeed be a desperate one; but gliomas lack one of the most characteristic signs of a malignant tumor: they never metastasize, they never invade the dura, but some of them infiltrate the adjacent brain tissue. It is a local disease and, if the tumor can be removed, there is no danger of its recurring elsewhere. This, then, is the crux of the problem, can the tumor be removed completely, and, if so, what are the best methods of doing this?

The first point to emphasize is that there are different kinds of gliomas—the solid and the cystic. The cystic gliomas are of three types. First, the simple cysts containing yellowish, gelatinous fluid with a small solid gliomatous mass in one spot of the wall, but the rest of the cyst wall is not composed of gliomatous tissue; second, the single cysts composed of gliomatous tissue with no single nubbin of gliomatous tissue; and thirdly, the cases of multiple gliomatous cysts in a mass of solid tumor.

Of these three types, the first is the most favorable tumor we have in the brain. The emptying of the cyst or removal of the wall with the nubbin of tumor effects a permanent cure. At times the nubbin may be inaccessible or only partially removed, and then the cyst may refill in the course of months. Occasional evacuation of the cyst may keep the patient comfortable for a long time. Sometimes they cease to secrete and the patient remains well. Under what circumstances this happens and what factors influence this fortunate outcome we do not know.

The second type of gliomatous cyst in which the wall is all gliomatous is less promising, though here, too, removal of the cyst wall or destroying it by some cell fixative, as Zenker's solution, may give a permanent cure. If the cyst refill, it may be retapped but at times these cysts change into solid gliomatous tumors. The cases with multiple cysts must be considered with the solid tumors.

With the solid gliomas, the problem is a different one; can one remove a solid glioma? I have been struck by the fact that not all gliomas are infiltrating, but some have a definite line of demarcation though not a true capsule. My policy at present is, and has been for a number of years, to attempt to remove a tumor if I possibly can, for to leave a tumor means ultimate death; however, I do not attempt to remove every tumor. I have no rule of thumb by which I determine which tumor I shall remove and which I shall leave in even after I have exposed it. No two surgeons will absolutely agree on this point, for that rare indefinable quality known as surgical judgment, a twin of that rapidly disappearing quality known as the art of medicine, must be our guide. The two extremes at present, I think, are represented by the Mayo Clinic and the Baltimore Clinic. The former leave gliomas alone surgically; the latter attempt to remove everything. I agree with neither of these two policies but steer a middle course. To remove a tumor completely but leave the patient so seriously disabled that he is a burden to him-

self and his family, is a questionable triumph of surgery. It is similar to some of the victories in the recent war when conquered cities were mere smoking, battered walls. What is occupying my attention at present is trying to determine, if possible, either before or at the time of an operation, which are the removable gliomas. Diagnostically as yet we have not found any means of differentiating the various types of gliomas, but at operation a fairly accurate differentiation is possible. It is not even always possible to know before operation if one is dealing with a glioma, regardless of the type. A case that rapidly develops tumor symptoms is almost certainly a glioma, but I have seen cases that could readily be enucleated in spite of their very rapid growth.

Before taking up the second subject, it might be of interest to dwell for a few moments on certain factors that make these operations fairly safe, far safer than they have been in the past. These factors may be summed up in a few words.

1. Expert anaesthesia controlled by careful, frequently repeated blood-pressure observations.

2. A trained corps of assistants.

3. Improvements in the technique of the surgical procedures, and, if necessary, doing the operation in several sittings.

4. Making free use of blood-transfusion as a post-operative stimulant.

For the anaesthesia, I believe a trained anaesthetist is essential, one who knows how to handle cerebral cases, for these are different from the ordinary surgical cases. The depth of anaesthesia must be much lighter than for an abdominal case. We have found the Connel percentage ether apparatus particularly valuable. With an expert anaesthetist, I have not felt the need of using local anaesthesia except very occasionally.

As regards the other three factors, I just want to say this. Work in the intracranial cavity is enormously simplified if the problem of the cerebrospinal fluid is properly handled. The free use of ventricle-puncture is a *sine qua non*. I have never seen any harmful effects come from the withdrawal of cerebrospinal fluid by ventricle puncture. The reduction of intracranial pressure by withdrawal of cerebro-spinal fluid is essential. Occasionally the ventricles are collapsed, and then the surgeon faces a most difficult situation. Hypertonic salt solution or even lumbar puncture may be necessary, though the latter procedure I consider very precarious in cases of increased intracranial pressure.

Blood transfusion we are using very freely. In the past two years we have transfused twenty per cent. of all craniotomies and, of the eighty tumor cases in this series, thirty-one and a third per cent. were transfused. Blood is certainly a much more effective post-operative stimulant than normal saline. If the patient's blood pressure has dropped markedly at the end of the operation, we usually give 500 c.c. of blood by the syringe method. We prefer this to citrated blood as we get far fewer reactions. I am quite sure that on a number of occasions we have given blood when salt solution might have accomplished almost as much, and consequently we have been criticised for this, but the remarkable effect it has on patients after a long operation makes me continue this practice.

Hydrocephalus still remains a difficult problem. The cases of hydrocephalus associated with cerebellar tumors I shall not consider, for the removal of the tumor relieves the hydrocephalus. I refer to the case of hydrocephalus due to obstruction by inflammatory processes around the fourth ventricle or aqueduct of Sylvius, and those cases of hydrocephalus now called communicating hydrocephalus. The type of hydrocephlus must first be determined. Dandy's method of injecting a neutral dye into the ventricle and observing its excretion I have discarded, as we had such alarming temperature reactions from the injections. I have returned to the old method of doing a double puncture, ventricular and spinal, and connecting each needle with a glass tube and noting if the fluid rises to the same height in both tubes. If it does, we have a communicating hydrocephalus; while if the fluid stands at different levels with the patient lying on the side, we have an obstructive hydrocephalus. For the latter type I have been doing an operation for the last seven or eight years which is comparatively simple and seems to be effective. I make an opening over the fourth ventricle and allow the fluid to escape into the subcutaneous tissues where it can then be absorbed. If the obstruction is above the fourth ventricle, some such method as Dr. Dandy has described must be used to

open the aqueduct of Sylvius. This increases the danger of the operation tremendously, and has thus far not led to very good results. I have tried it two or three times but have no successful case.

The treatment of the communicating hydrocephalus is indeed an unsolved problem. Dandy's suggestion of limiting the source of the cerebro-spinal fluid by removing the choroid plexus seems the only rational one, but it is a severe surgical interference. I have done it four times. In one infant the head ceased to enlarge, but five months later the child died of a pyelitis, so that I cannot express a positive opinion about the permanent value of the method.

Hydrocephalus may properly be called an unsolved problem, but now that we know how to differentiate the various types, we can deal with these cases more intelligently. A recent experience illustrates this very well. A child of four weeks began suddenly to develop hydrocephalus. It had been a premature infant and had a temperature of 107° the day after its birth. The temperature then fell to normal. The child did not gain and there was constant feeding difficulty. At four weeks, Dr. Tuttle, who referred the case to me, noted hydrocephalus. Lumbar puncture revealed a yellow fluid full of flocculi; culture was negative. Removal of spinal fluid did not influence the hydrocephalus. Spinal puncture, the next day, yielded only a few drops. Ventricle puncture showed the same yellow fluid. We evidently were dealing with an intraventricular birth-hemorrhage which had caused an obstructive hydrocephalus. As the child was failing rapidly, I attempted something that, as far as I know, had not been done before. A ventricle needle was put into each lateral ventricle and the ventricles were irrigated out with normal saline. Following this, lumbar puncture yielded a copious flow of cerebrospinal fluid, and now the cerebrospinal fluid is normal, the head has ceased to enlarge, and the child is gaining steadily.

Spinal surgery offers us a number of problems on which we want more light, but it also has reached a far more satisfactory stage than the surgery of hydrocephalus. Spinal tumors are favorable cases for operative removal as the majority of them grow from the meninges, and though they may compress the cord very markedly, they do not destroy the cord as a tumor growing in the substance of the cord may do.

Our greatest difficulty still consists in determining whether the symptoms of a focal spinal lesion are due to tumor or some other process. In the first ten or fifteen years, when spinal tumors were being operated upon, following the epoch making monograph by Victor Horsley and Gowers, two points were considered essential to warrant the diagnosis of spinal tumor. One was pain, the other was the progressive character of the disease. If a case did not present one of these two features the diagnosis was not deemed justifiable. We know today, however, that a patient may have no pain and still have a spinal tumor; and there may be a remission of symptoms and the spinal symptoms nevertheless be due to a spinal tumor. It has been claimed that only those spinal tumor cases have no pain that are intramedullary, that is, have their origin in the substance of the cord. To determine that point, some years ago I reviewed all my spinal tumor cases and found that in my own series pain was not such a prominent symptom and that quite a number of extraspinal tumors, that is, meningeal tumors, produced no pain. In addition to this, I found that even in those cases that had pain this symptom was not the initial or most prominent one. I believe that pain in spinal tumors only occurs when the posterior nerve roots are involved or pressed upon, while if the tumor lies between roots (and this may occur particularly in the dorsal region where each segment is rather long) there may be no pain. In my series the initial symptom was some form of paraesthesia: burning, pins and needles, or formication, and this symptom is so indefinite that not a few of the cases, before they finally get relief, have become so discouraged that they consulted osteopaths or chiropractors. These paraesthesias have preceded objective findings, such as pathological reflexes or anaesthesia, by many months; and on purely subjective symptoms none of us would be willing to make a positive diagnosis.

The remission in symptoms may well be explained by changes in the vascularity of the tumor. Two cases in my series illustrate this point strikingly. One was a fibroma. On removing the tumor it was found to have practically no blood supply, and microscopic

sections showed very few and extremely minute vessels. At one time this patient had been totally paralyzed but, when he came under observation, he had some sensation and some movements in his lower extremities. While this tumor was growing I believe it had a good blood supply, and then the tumor had cut off its own blood supply by pressure and consequently had shrunk, thus giving more room to the spinal cord. The other case was that of an angioma of the cord. This patient had periods of complete paralysis, and then again marked periods of remission. She had consequently been diagnosed as an hysterical paralysis by her physicians in Russia, and they had employed on her the drastic methods that had been used in the army on functional cases, but of course without avail.

If pain need not be present and the symptoms are not continuously progressive, how shall we determine if the picture of a transverse myelitis is due to tumor? One point is of great value. Cord tumor symptoms come on fairly slowly, at least in the course of a few weeks, while myelitic symptoms from other causes usually develop much more rapidly. The character of the line which marks the beginning of the disturbed sensation is sometimes said to be different in tumor cases than in myelitic cases. Increased reflexes, paralyzed muscles and disturbed sensations are observed in focal spinal lesions regardless of the cause and therefore they will not assist in the differentiation. The history of the case and the character of the line of changed sensation are almost the only points of value; there are cases in which it is impossible to determine if the paralysis is due to a tumor or not. In these cases the injection of air into the spinal canal and taking an X-ray picture may be of value, or the test of Ayer, of Boston, by which he determines if there is a spinal block; but Ayer himself has pointed out that spinal tumors do not always produce such a block. I still feel, therefore, that the old dictum of Victor Horsley should not be discarded, that every patient with the symptoms of a focal spinal lesion has not been given a fair chance unless he has been explored.

The determination of the exact level at which a lesion is located requires a most careful study of the disturbances in sensation as well as changes in reflexes and motor power. I find that there is a surprising carelessness on the part of many men in making sensory examinations. If there is merely diminution in sensation, not complete loss, the greatest care has to be exercised. To examine a patient with but part of his clothing removed may lead to serious error for, where fine distinctions in sensation are being studied, the weight of the clothing may confuse the most intelligent patient. In finding the region in which normal sensation begins one should always examine from the abnormal to the normal area. The patient must always be lying down, and the examining room should be warm. The usual tests, of course, are made with a needle and cotton wool, and, as a rule, these are much more satisfactory than testing disturbances in temperature sense, but occasionally temperature disturbances are more valuable guides. I recall one instance where I was only able to establish the sensory level by means of a piece of ice.

These remarks about methods of examination no doubt seem very elementary to most of you. My reason for mentioning them is that they are so frequently disregarded.

I have endeavored this evening to outline for you some of the solved and unsolved problems which are occupying the attention of neurlogical surgeons. It is one of the most fertile fields for clinical research. It has made great strides in the last decade, and during the next decade unquestionably many of the unsolved problems will be still further elucidated.

THE GROWING IMPORTANCE OF MAPPING FIELDS OF VISION.*

By W. E. DRIVER, M. D., Norfolk, Va.

It is almost impossible to over-emphasize in treating diseases of the eye today the importance of locating in its earliest stages any form of progressive trouble with the optic tract as well as with the eye proper. In other words, the eye surgeon, or oculist, is the guardian of the whole eye apparatus when the sight is in jeopardy. The value of his service to his patient is in direct proportion to his ability to *determine* the source of every interference with the vision and his ability to remedy such defects.

The fact that an oculist will examine a patient and fit glasses to his eyes that enable

*Read at the meeting of the Virginia Society of Oto-Laryngology and Ophthalmology in Roanoke, April 13, 1922.

him to see does not demonstrate by any means that he has gone to the seat of the trouble and found the underlying causes of the symptoms manifested. This is often shown by the continued trouble a patient may have, as headaches, the necessity for frequent change of glasses, and increasing hyperopia. It is now a well established custom that persons suffering from headache for any considerable length of time, or other troubles that seem due to the eyes, consult an oculist at once, without reference to the family or general physician, to learn whether or not the trouble may be due to the eyes. This, obviously, has increased to a large extent the responsibility of the oculist in making his examinations.

Certainly it has been conclusively demonstrated in the last half century that the mapping of the fields of vision is the most illuminating of all methods of recognizing interference with the visual tract. The careful plotting of the visual fields in securing reliable records of affections of the eye and optic tract requires both time and patience, but after years of experience in this work, I can only repeat that such mapping is the *most accurate* means of estimating the need for specific treatment.

If, in the case which I am citing below as an example of my point, the patient had been under careful observation, and accurate charts of his field of vision had been plotted at the time he was first sent to the hospital, probably his sight could have been saved.

The following is the history of a case which came under my personal observation and one which particularly illustrates my argument.

"Hypophyseal struma with primary optic atrophy and bitemporal hemianopsia. Dyspituitarism with evidences of former activity. High sugar tolerance. Chronic hypoglycaemia. Operation. Partial extirpation of growth.

HISTORY: June 1, 1910. B. C., a coach painter, was referred to the hospital by Dr. C. M. C., complaining of loss of vision. One of a large family of healthy children, he enjoyed a fair measure of health himself until his present trouble. The usual infantile infections were followed by a very severe typhoid and a secondary pneumonia at 14. He subsequently *grew very rapidly*, and at 17 measured six feet in height. At 23 he had another attack of typhoid and at 28 pleurisy.

Apart from these illnesses the patient has been well; a hardworking man of more than average physical strength. He has used tobacco to excess and alcohol abundantly, but otherwise has had no vices. Though he works constantly with white lead and oil, he has never had any occupational colic or neuritis. He has been married five years and has one healthy child.

PRESENT SYMPTOMS: In March 1909 he accidently observed that vision in the left eye was dim. It has progressively failed. He has had occasional temporal *headaches*, but they have not been frequent or severe, no nausea or vomiting. *Photophobia*, with aching pain in the eyeballs, has been his chief source of annoyance.

At the time of his first admission in June, 1910, although the fields of vision aroused some suspicions, the X-ray plate was inconclusive, and expert ophthalmological opinion was emphatic that the condition was a typical *lead* or *tobacco amblyopia*. A gloomy prognosis was given; he was given large doses of potassium iodide and *discharged*, the visual acuity in the left eye having dropped markedly during the two weeks he was under observation.

August 10, 1911. Readmission. The patient, by good fortune, was seen by Dr. W., who found a typical bitemporal hemianopsia, and he was advised to re-enter the hospital."[1]

Mapping fields of vision, to be sure, is subjective, but it is not as misleading as one would suppose when it is done by skilful persons. Dr. Cushing, in his article entitled "Distortions of the Visual Fields in Cases of Brain Tumor"[2] (1911), mentions the fact that patients had brought to him charts on which the fields of vision had been plotted elsewhere, but as a rule they had been so casually mapped that they were too unreliable for diagnosis. He says: "Too few circumferential points are usually taken, and the cards, as a rule, are so small that the color interlacing, on which we have come to lay such stress, is not apparent. Furthermore, a number of our best illustrations of hemiachromatopsia were entirely overlooked on tests made shortly before the patients' admission to the hospital, the fields of form alone having been recorded."

Albrecht Von Graefe[3] was the first to call attention to the importance of testing the visual field in ophthalmic practice. He showed that for many intra-ocular diseases there are special varieties of contraction of the visual field, which are more or less characteristic of these diseases, and can be utilized for this diagnosis. Since then (about 1860) the visual field has been much cultivated, so that at present its examination has great significance, both for diagnosis and prognosis.

The importance of mapping fields of vision in diagnosing intra-ocular diseases was conclusively demonstrated by Von Graefe, and since that time much has been added to the methods used in the accurate plotting of the visual fields. Among those who have followed Von Graefe's discoveries along this line and perfected the methods of plotting have been Soelberg Wells, Donders, Bjerrum, de Schweinitz, Wilbrand, Cushing and Walker.

In his Treatise on Diseases of the Eye,[4] Soelberg Wells (1868) says: "Besides examining the acuteness of vision, it is often of much importance to ascertain with accuracy and care the condition of the field of vision." Wells did not use the graduated disks in determining the field of vision, but plotted the periphery of the field of vision on a blackboard by using chalk held in a dark handle while having the patient keep his eye on a certain spot in the center of the board.

De Schweinitz (1892-1916) plots a field of vision in much the same manner as Wells, when he wishes a field not larger than 45° in extent. For a larger field, in determining the periphery of the retina, he uses the perimeter. This, as is well known, consists essentially of an arc marked in degrees, which rotates around a central pivot, that at the same time may be the fixing point of the patient's eye. The test object, 1 to 2 cm. in diameter, affixed upon a carrier, is moved from without inward and the point noted on each meridian where it is recognized.

"Bjerrum, in 1899, proposed an addition to the usual method of examining the field of vision. The addition consists in making use of white objects which subtend a very small visual angle. The examinations are made at a distance of two meters, using a large black screen two meters in breadth, which can be let down from the ceiling to the floor. At this distance, the blind spot, instead of measuring 2.5 mm., as on an ordinary perimeter, measures 20 mm. in diameter, and everything else in the same proportion.

"The objects used by Bjerrum are small circular disks of ivory fixed on the end of a long black rod. They vary from 10 to 1 mm. in diameter.

"The examination is begun in the ordinary manner (at 30 cm.) with the 10 mm. disk, and then continued at two meter distance with a 3 mm. disk. In the first case the visual angle approximately is two degrees, in the second five minutes. This method is valuable in finding section-shaped defects, irregular limitations, and scotomas, and should supplement ordinary perimetric work in all important examinations."[5]

Clifford B. Walker, in Harvey Cushing's service, in his examinations of patients with intracranial lesions, finds it necessary to investigate the field of vision for test objects varying in visual angle from one or two minutes to about 8,° and has designed a series of circular rimless colored and white disks, supported on wire handles, which cover the required range, taking the "normal" of 5 mm. disk as the unit. In this series the smallest disk is 0.15 mm. and the largest 4 cm. in diameter. His special perimeter has a radius of 28.6 cm. and a large working surface 66° by 130° in extent.[6]

Clifford Walker has gone further than this in the study of defective retinal areas with a series of large disks.

Although there is more labor involved and in some instances there seems little to be learned in a further plotting of the fields, as a matter of fact there is much more to be learned, though the information obtained throws more light on the prognosis than on the diagnosis. The large disk is rather of more value in advanced cases which are to be carefully watched before and after operation; even though the small or normal disks may show very little change, although active changes may be going on in those parts of the retina found to be defective to the normal disk, both before and especially after operation.

Examination with large disks should be made on all field defects whether of anterior or posterior origin. The results are much more striking in anterior lesions than in posterior, and this is true to such an extent that it is useful as a diagnostic point in differentiating anterior and posterior lesions.

In the instance of cases presenting themselves for operation with rather damaged fields and a diagnosis of a lesion in the chiasmal region, all knowledge possible is necessary concerning the visual prognosis and the state of the defective retina before operation. After operation it is necessary to detect the earliest improvement in the defective area and to follow its progress. The very small disks may show very little change, while a series of large disks may show marked improvement in the field. The inner field represents the normal disk. The next larger field is taken with a disk twice the normal diameter; the third outer field is taken with a disk of twice the diameter of the previous disk or four times that of the normal disk, and likewise the outermost disk is twice the diameter of the next inner or eight times the normal disk.

The small disks are not shown in this first series, but the same relation between disks holds down to the smallest which has a visual angle at perimetric distance of about 1.7 minutes, close to the limit of visibility. Of course, when there is scotoma, the order of the disks is reversed, the inner border representing the larger disk, and the outer border the normal disk, so that if there are less than four margins in a scotoma, it means that a corresponding number of the largest disks are seen in the scotomatous areas and therefore are not recorded.

Some of the diseases most readily diagnosed by examination of the visual fields, with details of diagnosis, are briefly described as follows:[7]

Glaucoma Simplex: A form of glaucoma with no pronounced inflammatory symptoms, but attended with progressive loss of vision. The contraction of the visual field begins most frequently on the nasal side. A very frequent, according to some, constant, change is an up-and-down elongation of the blind spot, so that a sickle-shaped scotoma is produced (Bjerrum) arching above or below round the fixation point and even reaching the horizontal meridian on the other side of the latter (Ronne). In this way an annular scotoma may ultimately develop. In glaucoma simplex central scotomata may occur, so that with a large field of vision the central visual acuity is impaired early. The reverse also occurs; that is, a marked concentric contraction with good central vision.

Optic Nerve Atrophy: The atrophy of the optic nerve fibres is the most important cause of the decrease of visual power which accompanies the elevation of tension. Impairment of both direct and indirect vision occurs. The former finds expression in the gradual diminution of acuity of central vision, the latter in the limitation of the field, which begins in the majority of cases on the nasal side, as the temporal side of the retina becomes insensitive first. Finally complete blindness supervenes.

With the diminishing sight is associated progressive restriction of the visual field (usually under the form of progressive concentric contraction or of sector-like defects, rarely under that of a central scotoma).

The field of *colors* is affected before that for white objects, the field for red and green disappearing early, and later that for blue.

By this fact atrophy is distinguished from glaucoma simplex, which sometimes shows much resemblance to it, but which is not ordinarily associated with color blindness till late in its course.

Atrophy of the optic nerve due to disseminated sclerosis is characterized by an irregular course, at times by transient improvement of sight, and rarely leads to complete blindness. It is unilateral. The field varies, but a central scotoma is relatively frequent.

Optic Neuritis: Subjective symptoms consist in defective sight; in severe neuritis complete blindness. Marked swelling with normal sight does also occur. Characteristic of many cases of neuritis is a sudden and momentary obscuration of sight, repeated often. Contraction of the *field of vision* is often found, sometimes under the form of hemiopia. Sometimes the only anomaly of the field is an enlargement of the blind spot.

Brain diseases are by far the most frequent cause of optic neuritis. They lead to disease of the optic nerve, either through producing congestion or transfer of inflammation.

The diseases of the brain which are complicated with *optic neuritis* are partly focal, partly diffuse affections. Above all it is the tumors of the brain which result in neuritis, usually under form of choked disk. Neuritis in this case is so frequent, said to be wanting in only ten per cent., some say more, of cerebral tumors, that it forms one of the most important symptoms. Accordingly, in every case in which there is a suspicion of the existence of a cerebral affection, the fundus of the eye should be examined with the ophthalmoscope.

In a report by Cushing, 1911, he mentions that cases of brain tumor causing visual defects seemed rapidly increasing, as of the 200 cases reported on, covering an interval of five years, eighty-two of them had come under observation during the last twelve months.

Tumor of the Brain: Von Graefe was the first to distinguish the inflammations of the optic nerve *accompanying diseases of the brain* into congestive neuritis (choked disk) and descending neuritis.

Retinitis Pigmentosa: A special variety of atrophy which runs a very chronic course is the pigmentary degeneration of the retina.

It is marked by such characteristic subjective symptoms that the diagnosis can be made almost from them alone. Persons affected with this disease complain that they see worse at night, or whenever illumination is reduced. Examination of the field of vision discloses the cause of this phenomenon.

In the beginning of the disease the visual field, when taken with good illumination, shows a broad blind zone between the center and the periphery (an annular scotoma). Central vision is good, because the periphery of the retina functions, orientation is good too, so that the ring-shaped defect in the visual field is not noticed. The peripheral portion of the retina, however, is undersensitive and, when illumination is diminished, it no longer functions, and then the periphery of the visual field disappears just like the portion that corresponds to the ring scotoma, so that the patient has left only the small central portion lying inside the latter.

In feeble illumination, therefore, orientation is no longer possible for him. And even the central portion of the retina is damaged, because the light sense in general is reduced, and hence the liminal stimulus is increased; that is, the minimum quantity of light required to stimulate the retina is greater than in a normal eye. As the disease advances, the periphery of the retina becomes entirely blind, so that even in good illumination nothing but a small central portion of the visual field is left, and the patient can scarcely guide himself alone even in daytime. At the same time direct vision may be so good that the patient may be able to do fine work. Finally, central vision too is lost, so that complete blindness supervenes, but not usually until late in life.

Detached Retina: The retina separates from the pigment epithelium even more readily than the choiroid separates from the sclera (as it does for example after operation); and the dreaded detachment of the retina is nothing but the retransformation of the virtual cavity of the ocular vesicle into a real one.

Detachment of the retina is diagnosticated by means of the ophthalmoscope, which shows the detached retina under the guise of a delicate gray membrane that rises above the level of the normal fundus and projects toward the vitreous. Exteriorly the eye looks normal, only the anterior chamber is often strikingly deep and the tension is diminished.

The subjective symptoms of detachment of the retina consist in the disturbance of vision that it causes. This is characterized above all by a limitation of the field of vision, corresponding in location to the detached portion of the retina, which has partially or entirely lost its sensitiveness to light. If, as is so frequently the case, the detachment lies below, the patient complains of a dark curtain which veils from him the upper part of objects. For instance, he does not see the head of a man standing in front of him. Hence, the examination of the *field of vision* is of great importance for the diagnosis of detachment of the retina.

Strabismus: The vision of those who are affected by strabismus is distinguished from that of one-eyed people by the greater extent of the *field of vision*. In the case of a person who squints with his right eye, the exclusion of the right eye from the visual act is done only to avoid diplopia, and hence, is limited to those objects which throw their images in both eyes at once, that is, to those which are found in the portion of the visual field common to both eyes. The case is otherwise when the object passes into the temporal field of the squinting eye where it can no longer be seen by the other eye because hidden from it by the nose. Then the image of the object is not suppressed by the squinting eye. Hence, the field of binocular vision of a man with squint is about as large as that of a normal man.

The temporally situated portion of the visual field, for which there is no suppression of the images, corresponds to the innermost portions of the retina of the squinting eye.

Choroido-Retinitis: An inflammation that affects predominantly the outer layers of the retina, adjoining the choroid, will scarcely run its course without implicating the choroid too. Conversely, it is obvious too that choroiditis cannot exist without the portions of the retina immediately adjacent participating in the process. From an anatomical standpoint, every choroiditis is a retinochoroiditis, or chororetinitis, although the term is not generally used unless ophthalmoscopically visible signs of inflammation can be demonstrated to exist both in the retina and in the choroid.

In this disease the exudates from the choroid pass not only into the superimposed retina,

but also through the latter into the vitreous. Opacities thus produced are hence almost a constant accompaniment of chroiditis.

The vision is diminished as a whole on account of the cloudiness of the vitreous and the hyperaemia of the retina. But in those spots in which inflammatory foci exist, sight may be entirely abolished, so that scotomata are present in the field of vision. Owing to the fact that the retina over the focus of inflammation is pushed forward and its elements are displaced from their normal situation, objects whose images fall on the retina may appear distorted (*metamorphopsia*); straight lines, for instance, appear bent in various directions. Frequently also objects appear smaller than they really are (*micropsia*), or in the atrophic stage look larger than they are (*retinal macropsia*).

When, after the subsidence of the inflammation, atrophy of the choroid and of the superimposed layers of the retina has taken place, signs of absence of function, *gaps in the field of vision*, take the place of the signs of irritation.

This disease is chiefly dangerous because of its tendency to recur, in consequence of which new foci of inflammation are constantly developing in the choroid. With this is ultimately associated atrophy of the retina and optic nerve, so that obstinate cases of choroiditis terminate in partial or total blindness.

Metamorphopsia: Is the condition in which objects appear distorted. It is found in prechoroido-retinitis.

Metamorphopsia may be due to defects in the refractive media (astigmatism, especially of the irregular kind), refractive metamorphopsia, or to displacement of the retinal elements. The latter occurs when the retina is lifted up by an exudate (retinitis, choroiditis) or an underlying liquid or growth. If the process is such that the retinal elements are spread apart, as for instance occurs in a recent choroiditis or retinitis, an object looked at will look smaller than it is (micropsia). This is because a retinal image, that would normally occupy three retinal elements, now owing to the distention of the retina, occupies but two, and hence affords an impression corresponding to that afforded by an object of two-thirds the actual size of the object looked at. On the other hand, when the retinal elements, are abnormally crowded together, as occurs in the atrophic stage of retinitis and choroiditis, objects look larger than they really are (macropsia).

In the beginning of detachment of the retina objects frequently appear crooked, in consequence of the oblique position of the percipient retinal elements.

Effects of Drugs on the Field of Vision: *Strychnine*: This exerts an excitant action upon the optic nerve, so that even in normal eyes it produces a slight, although not permanent increase in the visual acuity and an enlargement of the field of vision.

It acts best in disturbances of vision unattended by changes visible with the ophthalmoscope, especially in hysterical and neurasthenic forms, which, however, generally afford a good prognosis anyway. In serious lesions of the optic nerve, as in progressive atrophy, we often obtain with it an improvement in the sight and especially an enlargement of the *field of vision;* but these changes are not permanent.

Quinine: In acute quinine poisoning (after doses of less than one to three gm. or upwards), sudden blindness sets in with hardness of hearing. In most cases the blindness disappears again gradually but incompletely, amblyopia and a markedly contracted *field of vision* remaining permanently.

Anatomical investigation shows in the first days of quinine poisoning a destruction of the ganglion cells of the retina, and as a result of the death of the ganglion cells a degeneration of the nerve fibres of the optic nerve very soon sets in.

Tobacco and Wood Alcohol: Nicotine and alcohol amblyopia are due to chronic poisoning by these substances, nicotine poisons more often than alcohol. In this country there have been many cases of methyl-alcohol poisoning—in a few cases this has occurred from inhalation of the vapor (as shellac workers), but generally from drinking cheap liquor, jamacia ginger, or other liquids which have been adulterated with deodorized wood alcohol. Blindness is almost always complete and permanent.

In nicotine poisoning, disturbance of vision sets in very gradually. The reduction of the visual acuity is most always the same in both eyes, a fact that distinguishes this from other intra-ocular affections, such as cataract, choroiditis, atrophy of the optic nerve.

In this poisoning, objective examination shows but *slight ophthalmoscopic change.*

Examination of the *vision* shows a moderate diminution of the visual acuity which has its cause in central scotoma. No gap is found in the field of vision if tested by means of a white object, but a red or green mark undergoes a change of color in the region of the scotoma. The outer limits of the visual field always remain normal and complete blindness is therefore not to be apprehended, but direct vision is destroyed, and with it the ability to carry on any fine work.

Enlargement and Tumors of the Hypophyseal Gland: With tumors of the brain there may occur not only congestive neuritis, but also descending neuritis and simple atrophy of the optic nerve. Simple atrophy may be produced because a tumor exerts a direct pressure upon the chiasm or the optic tracts, and thus causes their effacement.

An example of this is furnished by the interesting cases of tumor of the hypophysis, which, by pressing upon the chiasm causes atrophy of the optic nerves with temporal hemiopia.

In all cases in which the defect in the visual field is contained in one eye only, or in which, while there are defects in both eyes, they are not symmetrically situated, the lesion must be situated in the *optic nerve* itself, that is, in front of the chiasm. In temporal hemiopia the lesion is seated in the chiasm itself and is so placed that only the decussating fibres are affected by it. It most often occurs as an enlargement of the hypophysis cerebri. The symptoms vary, depending on whether the degeneration affects the glandular or the nervous portion of the hypophysis.

Unquestionably the hypophyseal gland is capable of great histological alteration at different ages and under different stimuli. Even in the case of actual enlargements to which the gland is subject and the tumors peculiar to its vicinity, there has been great disparity in the interpretation as well as in the nomenclature applied to the lesions.

Degeneration of the hypophysis causes the eye to suffer, although indirectly, owing to pressure of the enlarged gland upon the optic nerve. Thus it is often the case that the ophthalmologist is the first to discover a diseased hypophyseal gland.

One can readily see the growing value from the diagnostic point of accurately mapping the field of vision. As an aid to diagnosis its value can be compared to the X-ray and the Wassermann test in other branches of medicine. The neurological surgeons have emphasized the importance of this subject more than the eye surgeons, up to this time, which is an unwarrantable position.

In connection with the foregoing effort to demonstrate the importance of examining the field of vision, especially for diagnostic purposes, I wish to mention the investigations made by Dr. C. E. Finley, of Havana, Cuba. In his paper, "Bitemporal Contraction of Visual Fields in Pregnancy," presented before the International Congress of Ophthalmology in Washington, April, 1922, Dr. Finley clearly demonstrates that the "normal hypertrophy of the pituitary body which takes place in connection with pregnancy," in about seventy per cent. of such cases, produces "a compression of the chiasm which manifests itself by changes in the visual fields, in the nature of a bitemporal contraction, which varies in degree according to the amount of compression suffered."[8] Such contraction, however, it should be clearly understood, is the result of the state of pregnancy, and not the indication of permanent interference of the optic tract.

Besides the accurate mapping of the visual fields and the careful diagnosis that may be derived therefrom, I wish to stress particularly the fact that the eye surgeon should be able to remove and clear obstructions from the eye tract. There should be no part of the eye or its appendages with which he is not familiar enough to administer surgical and medical treatment.

For instance, in gumma, a syphilitic condition affecting one of the extra ocular muscles, the eye surgeon will not think for a moment of calling in outside assistance, but on the other hand, usually when he has determined from the mapping of the field of vision that a patient has an interference of the optic chiasm by an enlarged hypophyseal gland, he throws up his hands in horror and immediately calls upon the neurological surgeon, or the endocrinologist, for assistance. Diseases of the hypophyseal gland affecting the optic tract are so eminently a part of the eye surgeon's field that he should without question be qualified to cope with them.

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MATERNAL MORTALITY IN RICHMOND: A PRELIMINARY SURVEY.*

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"Maternal Mortality, a Crime of Today" is the title of a recent paper by C. Henry Davis.[1] That the high maternal mortality which still pertains in spite of the tremendous advances in the medical science of the past fifty years is a reflection upon the medical profession, public health work and the public in general, we all agree, but that it is a modern crime is open to considerable doubt. Maternal mortality certainly existed in the time of the patriarchs, for it is recorded[2] of Rachel that "when she was in hard labor, that the midwife said unto her: Fear not; thou shalt bear this son also. And it came to pass, as her soul was in departing (for she died), that she called his name Benoni; but his father called him Benjamin." How frequently such calamities occurred in ancient times it is, of course, impossible to tell. The earliest records available for such a study are those of the Registrar General for England and Wales, and these, according to Victor Bonney,[3] show that the death rate, directly and indirectly attaching to pregnancy and labor, has diminished woefully little in the last seventy years. A study of the maternal mortality in the United States from 1890 to 1913, by Grace L. Meigs,[4] of the Children's Bureau, U. S. Department of Labor, indicates that there is, if anything, a slight increase. She makes the statement that "child bearing in this country is a greater hazard to women of child bearing age than any disease except tuberculosis." Louis I. Dublin,[5] the statistician for the Metropolitan Life Insurance Company, says that deaths of women from puerperal causes affect the community deeply, because they occur at periods of life when each death involves serious loss, often causing a dissolution of the family.

The actual risk of child bearing cannot be determined exactly from statistics, as they have been kept. Rongy[6] makes the suggestion that birth certificates should have on the back spaces for certain facts about the mother and child, such as presentation, instrumentation, duration of labor, eclampsia, placenta previa and (we might add) pituitrin. There are, however, a number of ways more or less accurate of arriving at some conclusions. Davis[1] went over 5,000 consecutive life insurance examinations in the office of the Northwestern Mutual Life Insurance Company, and found that one applicant in seven had a mother or a sister or both to die from the immediate effects of childbirth, one in 27 from tuberculosis, and one in every 47 from malignant disease. Rongy[6] compared the number of deaths from puerperal causes to deaths from all causes and found that in the Bronx, in every 1,000 deaths, 7.3 were due to childbirth, and 8.7 if we include abortions. Another way of studying this question is to compute the mortality rate for women between the ages of 15 and 44. This was done by Dublin.[5] His material consisted of 14,694260 women carrying industrial insurance in all states of the Union, and he found a death rate of 68.4 per 100,000 women between the ages of 15 and 44, 66.1 for white women and 82.3 for negroes. Septicemia was responsible for 43% and toxemias for 26.4%. Harrar[7] studied the records of 101,197 deliveries at or near term at the New York Lying-in and found one maternal death in 317 out-patient deliveries and one in every 212 hospital cases.

Death rates from puerperal causes are usually computed in one of two ways by Health Departments. The usual way is to calculate the rate as so many deaths per 100,000 population. Another way is to use the number of births as a basis for calculation. The number of live births reported are now reasonably accurate. Howard[8] states that a truer rate would be obtained by comparing the maternal deaths with the actual number of deliveries. This is what he calls the real risk-rate of maternity. There are various sources of error inherent in either method. The principal sources of error for Richmond are as follows:

1. The deaths in our hospitals of compli-

*Read before the Richmond Academy of Medicine and Surgery, February 13, 1923.

cated cases brought in for treatment from outside the city.

2. Deaths from infection following abortions and stillbirths. (21.7% of all puerperal deaths).

3. Incompleteness of birth records in estimating maternal deaths per 1,000 births. (Probably 5%).

4. Multiple births.

5. Acute and chronic diseases complicating pregnancy and labor.

In the past three years a special study of all deaths from puerperal causes in Richmond has been made by the Health Bureau and it has been found that 14.7% of all puerperal deaths belonged in class 1. These were complicated cases brought to the various hospitals on account of the complications. In the same three year period 21.7% of the puerperal deaths were incident to abortions and premature deliveries. This causes an unduly high rate when the rate is based upon the number of live births. Both of these factors are very important in increasing the death rate from puerperal causes in Richmond. The incompleteness of birth records, amounting possibly to 5%, still further increases the death rate when computed on the basis of 1,000 live births reported. The error occasioned by the birth reports of multiple births, amounting to about 1 to 2%, works in just the opposite way from the preceding three years, and would tend to slightly lower the rate. The fifth source of error, that is patients dying from acute and chronic diseases in either pregnancy, labor or the puerperium, and classed by the International Classification of Causes of Death under puerperal conditions, was quite an important source of error in the recent epidemics of influenza. Under normal conditions this error is probably almost completely neutralized by real puerperal conditions being incorrectly reported and thereby being incorrectly classified.

The record of deaths in Richmond is complete as far back as 1907. In considering the death rates from puerperal conditions for this entire period, we have used the rate per 100,000 population as being the best method available. For the more recent years we have computed the rate per 1,000 births as approaching more closely the real maternal risk-rate.

Many people do not fully appreciate the importance of the puerperal state as a cause of death. As may be seen from Table I, more deaths were caused by the puerperal condition in Richmond during 1922 than were caused by typhoid, malaria, diphtheria, scarlet fever and measles combined.

TABLE No. I.
SHOWING COMPARISON OF PUERPERAL CAUSES WITH OTHER CAUSES OF OF DEATH—1922.

Cause of Death	Deaths	Death Rate Per 100,000 Population
Typhoid	8	4.5
Malaria	4	2.2
Diphtheria	16	9.0
Scarlet Fever	3	1.7
Measles	2	1.1
All Combined	33	18.5
Puerperal	34	19.1

Table No. 2 shows the deaths and the death rate per 100,000 population, white, colored and total, from puerperal causes, beginning with 1907. As may be seen from this table, the white death rate from puerperal causes has declined from an average rate of 22.2 in the five year period 1907-1911 to 17.9 for the five year period 1917-1921, while the white rate of 10.5 for 1922 is the lowest rate on record. The colored death rate from the puerperal causes has increased from 31.7 to 42.5 for the above periods. The rate for 1922 is 38.4, which is nearly four times the white rate.

TABLE No. II.
DEATHS AND DEATH RATES, WHITE, COLORED AND TOTAL FROM PUERPERAL CAUSES, RICHMOND, VA.

Year	Deaths			Death Rate Per 100,000 Population		
	White	Col.	Total	White	Col.	Total
Average 1907-1911	16.8	14.2	31.0	22.2	31.7	25.7
Average 1912-1916	19.2	16.0	35.2	20.1	32.7	24.4
Average 1917-1921	20.8	23.2	43.8	17.9	42.5	25.7
1922	13.0	21.0	34.0	10.5	38.4	19.1

Table No. 3 shows the death rate per 100,000 population from puerperal causes with the two principal causes, septicemia and albuminuria and convulsions, separated. As may be noted from this table, there has been a decrease in the death rate from puerperal septicemia during the last fifteen years. The death rate from albuminuria and convulsions on the other hand has remained practically the same, while the death rate from other causes has shown a slight increase.

TABLE No. 111.

DEATH RATES PER 100,000 POPULATION AS CLASSIFIED BY CAUSE, 1907-1922.

Year	Puerperal Septicemia	Puerperal Albuminuria and Convulsions	Other Causes
1907	10.6	7.9	0.9
1908	13.1	10.4	8.7
1909	11.2	9.5	7.7
1910	8.6	10.1	1.6
1911	9.2	11.5	7.6
Average	10.5	9.9	5.3
1912	9.0	4.5	10.6
1913	10.3	8.8	8.1
1914	15.1	8.6	9.4
1915	6.3	5.6	6.3
1916	7.4	7.4	4.9
Average	9.6	7.0	5.8
1917	9.8	7.9	5.5
1918	7.8	8.9	11.9
1919	2.3	11.2	5.4
1920	10.4	11.6	8.1
1921	6.3	8.5	12.5
Average	7.3	9.6	8.9
1922	6.2	5.0	7.8

The following table shows the perecentage of deaths in Richmond for each cause during the last sixteen years.

Cause	Per Cent of all Puerperal Deaths
Accidents of Pregnancy	10.7
Puerperal Hemorrhage	6.3
Other accidents of Labor	9.1
Puerperal Septicemia	35.3
Puerperal Phlegmasia, Alba Dolens, Embolus and Sudden Death	3.1
Puerperal Albuminuria and Convulsions	35.1
"Following Childbirth"	.4
	100.0

Any consideration of maternal deaths from puerperal causes at once brings up the midwife question. Dr. Julius Levy,[9] of Newark, N. J., in a recent elaborate study, has considered the statistics of New Jersey from this standpoint. His figures would seem to show that the results obtained by midwives are much better than those obtained in hospitals and in the private practice of physicians. During the last three years every death in Richmond from puerperal causes has been investigated by one of the infant welfare nurses of the Health Bureau. All deaths in which a midwife had been in attendance were charged to the midwife. There were during this period 19 deaths among 2,813 patients attended by midwives. giving a maternal mortality of 6.7 per 1,000 births. Excluding the deaths of imported cases and the deaths following abortion, there were seven deaths among 9,069 births attended by physicians, the maternal mortality being 7.8 per 1,000 births. The apparent slight increase in deaths of mothers attended by physicians may be atrributed to several causes: First, in one case at least, a midwife was called and, upon seeing the patient's condition, refused to assume the responsibility of attending her; secondly, in all cases of convulsions physicians were called or the patients were sent to hospitals; thirdly, pregnant mothers who either have chronic impairments or have acute diseases always call physicians; fourthly, cases of pregnancy in very young girls are usually treated by physcians. The following table shows the percentage of births attended by midwives for each year beginning with 1907:

TABLE No. IV.

ATTENDANT AT BIRTH.

Year	Births Reported		Per cent. Attended	
	Physician	Midwife	Physician	Midwife
1907	1375	936	59	41
1908	1621	1185	58	42
1909	1577	1262	56	44
1910	1504	1230	55	45
1911	1701	1239	58	42
1912	1814	1255	59	41
1913	1981	1154	63	37
1914	2019	1136	64	36
1915	2290	1183	66	34
1916	2689	1213	69	31
1917	2758	1079	72	28
1918	2778	1070	72	28
1919	2845	1170	71	29
1920	3231	1147	74	26
1921	3472	909	79	21
1922	3366	757	82	18

In 1921 all midwives in Richmond were required to take a course of instruction arranged by the Health Bureau and were further required to pass an examination before the midwife examining board, before being granted a permit to practice midwifery in Richmond. As the result of this work the number of midwives was reduced from 105 to 47. As may be seen from the above table, the number of births attended by midwives has shown a very great decline in the past two years.

Coincident with the decrease in the percentage of births attended by midwives, there has been a decline in the maternal death rate from puerperal causes among the whites and an increase in the maternal death rates among the negroes. The coefficient of correlation between percentages of births attended by midwives and the colored maternal death rate is -.4. The probable error of the coefficient of correlation is 0.1416. The coefficient of correlation is just

three times the probable error and is therefore insignificant.

During the last three years there have been 134 deaths from puerperal causes in Richmond. The following table shows the summary of the deaths by color, and the maternal rate per 1,000 births for the three years. It also shows the true city rate after excluding the cases brought to the city with complications and those deaths due to abortions.

TABLE V.

MATERNAL DEATHS PER 1,000 BIRTHS, EXCLUDING DEATHS OF IMPORTED CASES AND ABORTIONS, 1920-1921-1922.

	White	Col'd	Total.
Total births reported	7,541	4,341	11,882
Total deaths	57	77	134
Excluding deaths of imported cases (9 W., 10 C.)	48	67	115
Excluding abortions (10 W; 15 C.)	38	52	90
Maternal death rate per 1,000 births.			
Total	7.6	17.7	11.3
Excluding imported cases	6.4	15.5	9.7
Also excluding abortions	5.2	12.0	7.6

Nineteen of these deaths were of imported cases, and only incomplete histories could be secured. The cause of death of the 115 city cases may be classified as follows:

	White	Col.	Total	Per Cent of all
Post-abortal infection	10	15	25	21.7
Post-partum infection	8	11	19	16.5
Toxemia of pregnancy (eclamp.)	13	14	27	23.5
Hemorrhage	9	7	16	13.9
Exhaustion and Shock	6	2	8	7.0
Other infectious diseases	5	7	12	10.4
Ectopic gestation	3	4	7	6.1
Chr. Heart disease	0	1	1	.9
Total	54	61	115	100.0

A further study was made of these deaths in an effort to find out what type of prenatal care the patient had received. We realize that this information must necessarily be incomplete, as the person who could have given definite information along this line was dead. However, the information that we could obtain gives us some idea as to what had taken place.

	Per Cent
Engaged physician before onset of labor	30.0
Prenatal instruction given	24.0
Preparations made for delivery	27.0
Urine examined	23.0

A special study was made of the births reported from that part of the city west of First and lying between Broad and Main streets. This study was undertaken for the purpose of seeing what maternal mortality may be expected among a fairly large group of mothers, all of whom would be likely to engage physicians early enough for them to be given a certain amount of prenatal care. No births were reported from this area by midwives, and all negro births were excluded. In this area all deaths of mothers who were brought to the hospitals within this area from other parts of the city or from outside the city were excluded, as were also the deaths from abortion. All deaths of mothers from this section in hospitals outside this area were charged to the area. In other words, we have made an effort in studying the statistics in this area to find out what we may expect from a physician, if given a fair chance. While this study has not been carried on long enough to arrive at any definite conclusions, the results are very striking. The following table shows the results in detail:

TABLE VI.

PUERPERAL STATISTICS FOR SELECTED AREA

Year	Births	Maternal Deaths	Maternal Death Rate Per 1,000 Births	Births Per Maternal Deaths
1920	441	1	2.3	441
1921	462	1	2.2	462
1922	429	1	2.3	429
Total	1,332	3	2.3	444

Of the three deaths from puerperal causes from this area, only one occurred in the 1920 influenza outbreak from pneumonia; one of the deaths was due to embolism and the third death was due to eclampsia and post-partum hemorrhage. In addition to the above deaths, there was one death due to sepsis following an abortion of two months, where no physician had been called.

Conclusions.

1. The white death rate from puerperal causes has been gradually reduced in the past sixteen years.

2. The colored death rate from all puerperal causes has shown a decided increase.

3. The death rate from septicemia has shown a decided decrease.

4. The death rate from toxemia has remained approximately the same.

5. In computing city mortality from puerperal causes, deaths from complicated diseases brought into the city should be eliminated.

6. In computing rates per 1,000 births, deaths following abortions should also be eliminated, as we have no means of knowing the total number of abortions.

7. The midwife in Richmond is not an important factor in the maternal death rate.

8. Nothing approaching adequate prenatal care and instruction is given to a large part of the prospective mothers in the city. Our study would indicate that there is a large field for further development in this respect.

9. The results in the section west of First street (1 death per 444 births) approach very closely to what Dublin has stated as being the ideal for obstetrics (1 death per 500 births).

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CHRONIC ULCERATIVE COLITIS AND ITS TREATMENT.*

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Chronic conditions of an uncertain or even unknown etiology still form a considerable part of our list of diseases despite the steady advance in knowledge which has been made in recent years. Unfortunately, these same diseases are of a complex nature, respond poorly to most suggested forms of treatment, and are a constant source of embarrassment to the physician realizing, as he must, how little hope he can offer to his patient of even an alleviation of the distressing symptoms. The very multiplicity of the therapeutic measures employed is the surest indication of the futility of most of them. How eagerly the profession grasps at each new idea that may be offered, willing, and quite properly so, to employ any measure that may promise relief to the patient. Unfortunately, many of these suggestions are based on far too inaccurate observation and in many instances represent the result of some chance benefit derived from an entirely random use of medical or surgical measures. Such a condition as I have described is chronic ulcerative colitis. From the literature on the subject one gains a confused idea of various medical and surgical procedures, vouched for by their sponsors as furnishing a beneficent if not a curative effect on the disease. The only unanimity discoverable is in the matter of the relative value of strictly medical or surgical procedures held as one would expect by medical men and surgeons respectively, but after finding agreement in the broader principle it is immediately lost in the maze of detail, varying always with the individual. In this paper no effort is made to add to the already confused state of affairs by further suggestion, but rather by an analysis of present methods and theories to reach some conclusion as to the proper manner of handling the condition. Lacking an etiologic basis, which is always the prerequisite of intelligent treatment, we can but weigh the respective merits of methods already employed and endeavor to strike an average between the various radically different modes of approach to the subject.

The disease as an entity was first recognized by White in 1888 and his paper apparently aroused considerable interest in England, judging from the amount published on the subject in the next few years. During this period and indeed until comparatively recently there persisted confusion between the colitides or dysenteries of known etiology but distinct chronicity, and this particular type to which we can assign no definite causal factor. Indeed so recently as in the 1908 edition of Osler and McCrae's Modern Medicine the assertion is made that "there is not as yet sufficient evidence to warrant the separation of the condition from dysentery."

A clear idea of the nature of the disease is given by Logan[1] in an admirable review of a

*Read before the York County, (Pa.) Medical Society, November 2nd, 1922.

large series of cases treated in various ways at the Mayo Clinic. He says, "Under the heading of Chronic Ulcerative Colitis I shall consider only those cases for which no definite etiology has yet been found," and Yeomans[2] describes his paper as being "based on sixty-five cases of chronic ulcerative colitis of unknown etiology." Those two words "unknown etiology" being used to describe the condition, necessarily limit our discussion of this particular factor, but they require a certain amount of elucidation. The point is this, a chronic colitis to which we can assign some definite cause and thereby apply a rational therapy cannot be considered in the group under discussion. We can accept as belonging to this group only those cases in which none of the usual, or for that matter, unusual causes of chronic ulcerations of the colon can be assigned. This point cannot be emphasized too strongly. Much of the confusion existing in the matter of treatment is due to the fact that in discussion of papers, methods used successfully in the treatment of the ordinary bacillary dysenteries and colon infections are represented as being curative for this variety of unknown origin. Probably the most likely factor in its causation is some previous intestinal infection, either bacillary or of the parasitic variety, which perhaps leaves the intestines in a condition of lowered resistance. Thus Logan describes cases following ptomaine poisoning but with no significant bacteriology; he also suggests hyperacidity of the intestinal contents by citing relief of symptoms following alkali therapy. In Yeomans' series a majority occurred in the first three decades—this was also true of Logan's cases—and he mentions dietary and other youthful indiscretions as being a possible cause. Several writers have mentioned a previous history of amoebic dysentery but with no amoebae or cysts present at the time of examination. Yeomans gives a list of conditions preceding the actual disease in his series but concludes that these various factors—infections, operations, pregnancies, etc.—can only have played a part in that they lowered the individual's general resistance. The disease is not transmissible. Examination of the intestinal flora seldom shows anything more than the usual types of organism. Kendall feels that "Normal intestinal organisms, or types indistinguishable from them by ordinary methods of study, may multiply with abnormal luxuriance through unusual conditions; extend their normal habitat and crowd out some of the existing organisms, eventually leading to abnormal reactions in the alimentary canal which may be detrimental to the host." The possibility of some anaerobic organism being responsible for the disease has been frequently considered. The tubercle bacillus cannot be found in the stool. Yeomans found a positive Wassermann in only 3 of 58 cases examined in this way and very properly concluded that syphilis could not be regarded as an etiologic factor.

The gross and microscopic pathology is little more helpful. The picture depends entirely on the extent and duration of the disease. Yeomans gives an excellent pathological classification of the superficial changes in the mucosa. Primarily there is present a simple chronic inflammatory process, characterized by different types of ulcers in various stages of development. These ulcerations as seen through the sigmoidoscope range from the superficial discrete variety to those with a deep hemorrhagic or necrotic base. Perforations occasionally occur through this latter type. The mucosa may be uniformly thickened or thrown into the form of polypoid tumors; this latter condition has been mentioned as a complication. The submucosa and muscular coats may be thickened or thinned and, though the intestinal mucous membrane is fortunately prone to repair, the new formed connective tissue may undergo slight or marked cicatricial contraction. Under these conditions stricture may develop. Logan lays considerable emphasis on this scarring and consequent smoothing out of the mucosa. It has been generally believed that the ulcerations are present in greater numbers along the taenia coli, but Logan states that this was present in only four of his reported series of 117 cases. The rectum and sigmoid are most frequently affected though the caecum is often found to be definitely involved, suggesting the greater susceptibility of the fecal reservoirs. The entire colon in late cases shows ulceration and, when the disease has progressed very far, the entire large bowel may be simply a long, ulcerated pus discharging tube.

As might be expected, there is present microscopically a general round cell infiltration of the mucosa; the glandular epithelium is frequently destroyed and the glands themselves filled with leukocytes. Numerous chronic

ulcers of the mucosa are seen which, as stated above, after extending through the entire bowel wall may lead to perforation. These ulcers present no peculiar characteristics.

However obscure may be the etiology, certainly the disease presents symptoms which when combined with adequate laboratory examination will leave little doubt in the physician's mind as to its true nature. The outset is invariably marked by a diarrhoea. Logan and Yeomans both analyze their cases from the standpoint of symptoms presented. The stools may range in number from three to twenty in 24 hours. The character of the stool varies from time to time but in general is watery and contains varying amounts of blood and mucus. Blood is almost constantly present and the patients soon develop a secondary anaemia. There is sometimes an eosinophilia (these cells may occasionally be found in the bowel wall). Yeomans found an average loss of weight of about 20 lbs. Occasional cramp-like pains are felt, burning pains in the abdomen, indeed all the signs of inflammation. Abdominal rigidity is not a marked symptom. The disease is a distinctly chronic one, prone to remissions sometimes seasonal in character, and extremely likely to recur—a fact which should be borne in mind when analyzing the results of different treatments. In Yeomans' series again the average duration was two years and two months and these figures indicated the period the disease had existed before coming under his observation. In Logan's series only 18 had had symptoms for less than one year and only thirty under two years. Fever is a late manifestation. Up to a certain point the patients manage to maintain their usual activities in life, but unless given relief there develops a progressive weakness and prostration.

The diagnosis is readily made when all other conditions have been ruled out and, as I have indicated above, this process of elimination requires facilities which unfortunately are not always at hand. The bacteriology of the gastro-intestinal tract presents difficulties and problems of a very special nature. The methods and equipment for isolation and identification of the intestinal flora can be found only in especially equipped laboratories under the direction of trained bacteriologists. The history may be typical. The following case will illustrate it:

The patient, an undernourished, anaemic young man, 19 years of age, came under observation after suffering from a colitis for four years. The trouble had started with what seemed to be a mild dysentery which failed to clear up in the usual time; diarrhoea persisted in a moderately severe form for several months when mucus appeared in the stools in considerable quantity and soon after blood was found. Therapeutic measures were adopted which proved beneficial for about six months when the trouble returned as severely as before. Ten stools a day with abdominal pain and rectal tenesmus were the principal features. Medical treatment again brought about some relief for nearly a year when there was a second recurrence which persisted until the patient came under our observation. At this time there were about 15 stools a day with large quantities of blood and mucus. He presented all the characteristic clinical and laboratory findings of chronic ulcerative colitis.

The outset may be associated with some definite disease attack or there may be elicited some clear cut story of dietary trauma or privation.

Laboratory studies invariably fail to show any of the usual parasitic or bacterial invaders in the feces. This part of the diagnosis must be thorough and exhaustive as it is only after elimination of every known cause that we are justified in placing the case in the class under discussion. Syphilis must be ruled out by careful blood examination and tuberculosis by examination of the lungs and intestinal flora. In the opinion of both Logan and Yeomans, direct inspection of the rectum and sigmoid are of the greatest aid in diagnosis. If the case is seen early the upward invasion from the recto-sigmoid junction can be followed—a fairly typical occurrence—and the general appearance and growth of the ulcerations observed. Benign and malignant tumors, strictures, etc., can also be ruled out in this way. These two authors are also agreed on the value of X-ray examination. The extent of the process can be seen when the transverse and ascending colon are involved, a point which the sigmoidoscope fails of course to show. Early there appears the typical picture of an irritative condition with increased peristalsis. But with the advance of mucosal involvement and the resultant thickening and fibrous tissue formation, peristalsis becomes

much impaired. The waves are flattened out, as it were, and "the colon becomes a stiff walled tube without haustrations." (Logan). Stricture may follow. Yeomans states that in none of the sixteen cases examined by X-ray "were upper segments of the colon demonstrated to be implicated without the descending colon and sigmoid." The disease is primary in the rectum and sigmoid.

Logan summarizes the diagnosis as follows: (1) The history of an intractable diarrhoea which in the large majority of cases contains blood, pus and mucus; (2) by not finding any parasitic or known bacterial cause in the stool; (3) by the proctoscope showing involvement in the rectum and lower sigmoid, or (4) by the X-ray showing the characteristic changes in the colon.

Obviously the prognosis must be a guarded one. As we shall see presently in the discussion of treatment no single therapeutic measure has been of value in all hands. When apparently cured, the disease is prone to recur and not infrequently the individual fails to respond to any measure adopted whether medical or surgical. Complete cures are very much the exception. Alleviation of severe symptoms and control of any further extension should constitute our preliminary prognosis. Even this may be too sanguine. The subject of treatment is a vast one. Special therapeutic measures have been suggested, tried, and reported with extraordinary regularity. Surgeons and medical men have been equally prolific in their suggestions and in many instances have combined each other's ideas, thereby offering an appalling number of possible methods of treatment.

Treatment of diseases of the alimentary tract is a difficult problem. Unlike similar conditions on the surface of the body, which we can deal with more or less in an individual way, our attention, in organic disturbances of the digestive apparatus, must be divided between the local condition and the elaborate physiological mechanism of the structures involved. This point is often lost sight of. No where, not even excepting the urinary apparatus, is treatment made so difficult by functional activity as in the intestinal tract. While dealing with the lesion our therapy is constantly interfered with by the passage of irritating fecal material over the raw and bleeding surface of the ulcers. Little wonder is it that these conditions become chronic. A similar problem is met effectually in the case of ulceration of the stomach and duodenum by the almost universally used gastro-enterostomy which in the last analysis is simply a mechanical side-tracking of the the stomach content. It has been everyone's experience that large indurated ulcers of the stomach fairly fade away after the irritating action of food mixed with gastric juice has been removed. Local applications here would hardly be considered. Furthermore, unless we have the benefit of some specific drug, such as emetin, how useless must most of our attempts be to sterilize that part of the tract where bacterial and parasitic growth is so luxuriant. How difficult we frequently find sterilization of the male urethra whose comparatively simple mucous membrane and glands offer few of the difficulties of approach found in the elaborate rugae and secretory apparatus of the large and small bowel.

As in every problem connected with the gastro-intestinal tract, there are two distinct forms of therapy, medical and surgical. Zealous proponents of one or the other tend to be intolerant of any but their favorite measure.

The basis of all the medical therapy of chronic ulcerative colitis is irrigation with antiseptic or healing solutions. Medication by mouth would hardly be considered as a possibility, though of course diet in that it changes either the consistency or reaction of the fecal material may be of benefit. Rectal and colonic irrigations have long been employed as therapeutic measures—instillations of solutions of the silver salts, $AgNo_3$, arygyrol and protargol in mild cases which have not extended any great distance upward seem to have been of some benefit; so too, the use of a bland, non-irritating oil which so lubricates the bowel wall that the irritative action of the fecal material is partially allayed. This oil should be retained over night if possible. Other irrigations used are solutions of the common salts, sodium chloride, sodium bicarbonate, boracic acid solution, potassium permanganate, hydrogen peroxide (I have seen such an irrigation cause perforation of the bowel where a large ulceration was present) quinin and chloramin-T. The irrigations should be given in the knee chest position with the proper precaution observed against over distending the

bowel. Yeomans considers peroxide in two per cent. solution the best; Logan prefers argyrol but said the best results were obtained from enemata of hot water 120° F. In one case he secured healing with complete disappearance of symptoms after four months of such treatment. Bassler[3] feels that "enemata are not apt to be helpful and are often harmful" and states, "If the bowel cannot be irrigated from above, such as by the duodenal tube, the intestinal tube of Einhorn or by operation, it had best not be irrigated at all." Direct local treatment of individual ulcers through a sigmoidoscope is another method which is of course distinctly self-limited.

Oral medication may be said to begin with diet which in general should be such as to eliminate all irritating and highly fermentative articles and those which have any rough residue. Bassler gives this subject of diet considerable attention. He advocates a high protein diet of the usual meats, fish, eggs, green vegetables, butter, milk, cream cheese, gelatin foods, etc. And despite the diarrhoeic condition, he has cured a few cases by the simple use of an anti-constipation diet of bran t. i. d. in various forms, stewed prunes, heavy molasses, petroleum, vaseline, senna leaves and a liberal amount of water. Oil by mouth in addition to being a good tissue builder serves much the same purpose as a rectal irrigation. Bassler has had good results from the use of gentian violet in enteric coated pills each containing 0.016 gm. This procedure is based on the selective bactericidal action of gentian violet. Churchman[4] considers that the dye has a bacteriostatic action on the organisms, that is the dye suspends reproduction without implying that the organisms are necessarily killed. Spores are also affected by the dye. Many of the intestinal flora are susceptible.

An interesting procedure is that which has been used successfully by Einhorn[5] in two cases of ulcerative colitis. I speak of the Einhorn intestinal tube by which true colonic irrigations can be given without the aid of surgery. The time consumed in passage of the tube is one week—for withdrawal three days. The treatment lasted for 46 days—several types of irrigations were used the most efficacious being calcium carbonate and water 0.5: 1000 c.c. with 15 gtts. of ichthyol in the latter part of the drip. He also used mercurochrome one per cent. solution zii q.d. for one week. The patient gained 23 lbs. and was considered cured. Bassler prefers irrigation through a simple duodenal tube. Autogenous vaccines have been used with success by Yeomans but Bassler found little to recommend them and Logan feels the same way. Intravenous therapy has been used. A negative Wassermann is, of course, not necessarily final and when other stigmata of syphilis are present salvarsan should be tried. Dr. Thomas R. Boggs, of Baltimore, tells me that in some of the intractable cases at the City Hospital he has used intravenous injections of 10 c.c. of a ten per cent. solution of calcium chloride with quite remarkable results. The bleeding is arrested almost immediately and subsequent healing takes place in over fifty per cent. of the cases. This is an interesting lead and one which deserves considerable attention and further trial.

It is more or less agreed that after a thorough trial of any or all of the above procedures and that after they have failed to give permanent relief resort should be made to surgery. Bassler, however, is not in complete accord with this general statement. He says, "The necessity of irrigation for months makes the Einhorn tube impractical. However, the duodenal tube method should supplant the operation for irrigations, especially since many of those treated by operation are improved only as long as irrigations are kept up and when the fistula is closed the re-performance of operation for the original purpose is not fair to the patient, especially when the results by duodenal or intestinal tube are every bit as efficient and can easily be resumed at any time."

Surgical methods employed are appendicostomy, first suggested by Wier; cecostomy; iliostomy; Brown iliostomy and appendicostomy; iliocolostomy; resection of sigmoid and colectomy. From the first three there is little to choose, the technique of the operation is simple, the object gained from each one practically the same. Any one of these openings simply furnishes a direct means of irrigating the affected portion of the bowel with the various healing solutions, but the procedure has no effect whatever on the downward passage of fecal material other than to hasten its discharge. The usual solutions prove efficacious,—potassium permanganate 1-10,000 increasing up to 1-5000, tannic acid 1 dram to the quart, plain water and salt solution either iso- or hypertonic all have a good effect. The

stools promptly decrease in number, their character is changed and the patient finds great relief. Little discomfort is experienced from the opening and the patient soon learns how to take care of himself. There is but slight discharge and, when the proper time arrives, healing is usually spontaneous. If occasion demands, the bowel can be reopened with very little difficulty and simply by the use of a local anaesthetic. This operation cannot in any way be considered a difficult or dangerous one and hardly seems to warrant Bassler's opinion of it. Frequently the bowel or appendix following closure will be found immediately beneath the skin when occasion for reopening it arises. Immediate relief of symptoms sometimes follows opening of the bowel. This suggests that the simple introduction of oxygen into the diseased colon may have a beneficent effect and, in conjunction with the theory that the causative organism might be an anaerobe, I have injected oxygen through the appendicostomy opening allowing it to bubble through very slowly and to remain in the bowel as long as possible. No cures were effected but there was marked relief in two of three cases after other irrigations had failed. In one the relief has been, so far as I know, permanent; in the second case there was a recurrence, and in the third no relief whatever was experienced.

Going a step further, and I think in the right direction, is the procedure first described and advocated by Brown, of St. Louis. Payne,[6] in an article entitled "Physiological Rest to the Large Bowel by Surgical Intervention," takes the matter up in detail. The operation consists in making a complete severance between the ilium and cecum. The stump of the ilium is brought out through the flank and the cecum is fixed to the abdominal wall and a cecostomy made. Thus the colon is entirely relieved of the necessity of functional activity and in addition to being given a complete rest can be treated exactly as in the other types of operation. Payne says the discharge from the small intestine is not particularly irritating to the skin and interestingly enough that in time the discharge becomes semi-solid. This may possibly be a somewhat too optimistic view to hold in regard to iliostomy as the discharge is undoubtedly irritating and certainly retains its fluid character for many weeks. After a rest period of 90 days, or however long a time is necessary to complete the healing, the ends of the bowel are sutured and the cecostomy opening closed if necessary. Payne has had excellent results in several cases. Iliocolostomy is an operation of some difficulty and at best relieves that portion of the colon which is usually the least severely involved.

Colectomy and resection of the sigmoid are emergency measures and should only be undertaken when all hope of relieving the ulcerated condition of the bowel has been given up. This point is reached only when the colon has undergone such marked structural change that it is simply a pus forming tube. Naturally, any such condition greatly increases the gravity of an operation which at best has a forbiddingly high mortality.

General hygienic measures must be adopted whether the patient be medical or surgical. A careful life, rest, sleep and fresh air will prove of benefit in this as in any other disease.

Statistics of improvements, cures and failures by the different methods advocated are of very doubtful value as there have been so far no consistently brilliant results from any one form of treatment. Yeomans, using only appendicostomy, cured approximately the same percentage of his surgical cases as those which he treated medically and constitutionally. He had one death in nine surgical cases. Logan using all types of operations claims no cures for surgery but reports many with marked improvement. His immediate surgical mortality was 11.8 per cent. but the variety of operations used was great and he had several colectomies. In his list Logan had seven cures in 38 patients treated medically, not by any means a brilliant showing but quite as good as any other reported series.

From this great amount of material we cannot help but feel the probable futility of much of it. However, lacking anything better we must make the best use possible of the means at hand. Whatever unanimity of opinion there is in regard to possible benefit from the various measures suggested would seem to justify our selecting as most valuable the following: Rectal and colonic irrigation except in very early cases can hardly be a method of any great value but should be made use of if the case can be diagnosed promptly. It represents the only means of treatment at hand for the general practitioner and for this reason can certainly not be ignored. Diet as prescribed by Bassler and whatever oral medication seems appropriate should be given a thorough

trial. The Einhorn tube, were it not for the natural hesitation one would feel in using it, is the soundest of the non-surgical procedures. It is difficult to see the value of the duodenal irrigation as advocated by Bassler which in regard to the colon can amount to but little more than irrigation of the large bowel with dilute small intestine contents. Drinking considerable quantities of salt solution or whatever the irrigating fluid might be would probably answer the same purpose. Autogenous vaccines should be tried as their administration is easy, they cause no discomfort to the patient and have been reported as giving beneficial results in some cases. Intravenous therapy wherever indicated should be adopted, particularly calcium chloride.

Of the surgical procedures, the Brown operation is undoubtedly the soundest from a physiological standpoint. Many patients would probably be much opposed to a fecal fistula even though assured of its ultimate closure and under such circumstances an appendicostomy or cecostomy would be the second choice. Colectomy would be justified under the rarest circumstances.

In conclusion we can say that:

(1) Since chronic ulcerative colitis is a disease of unknown etiology, its therapy cannot be definitely established beyond each individual case.

(2) Medical treatment should be instituted immediately the diagnosis is made; and should be continued only so long as the patient is deriving from it actual benefit.

(3) Physiological rest of the ulcerated bowel should be the aim of any surgical procedure adopted; and the more complete the rest obtained the better the possibility of a cure.

(4) If this is impossible the colon should be irrigated from above downwards through an opening in the appendix, caecum or terminal ilium. There is no perculiar virtue in any particular irrigating fluid.

(5) Due to the recurrent character of the disease, a case can be regarded as cured only after complete relief of symptoms for at least a period of one year.

(6) The prognosis should be an extremely guarded one.

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A CONSIDERATION OF SYMPTOMS AND HISTORY IN THE DIAGNOSIS OF PULMONARY TUBERCULOSIS.*

By DEAN B. COLE, M. D. Richmond, Va.

With a realization of the need of an accurate history in the diagnosis of pulmonary tuberculosis, and an appreciation of the needs of the busy practitioner, we will briefly consider the symptoms of pulmonary tuberculosis.

LOCALIZING SYMPTOMS.

1. COUGH is frequently the earliest symptom of pulmonary tuberculosis and almost always occurs at some stage of the disease. Any cough lasting more than three weeks should be looked on with suspicion.

2. EXPECTORATION—As a rule expectoration is closely associated with cough but may occur independently, the sputum being raised by hawking or clearing of the throat. In the early stages of tuberculosis the sputum is usually slight in amount and is frequently raised only early in the morning.

3. HEMOPTYSIS—Any hemorrhage of a dram or more should be attributed to pulmonary tuberculosis until proven otherwise. A tentative diagnosis will do no harm and may be the salvation of the patient. From 80 to 90 per cent of pulmonary hemorrhages are caused by tuberculosis and most of the remainder by bronchiectasis, lung abscess, malignant diseases of the lungs, and various mycotic infections, all of which will be benefited by a tuberculosis regimen until definite diagnosis is made.

4. PAINS—Most tuberculous patients suffer from chest pains, either pleuritic or toxic, or both. Pleurisy is always a suspicious symptom and, if an effusion be present, the cause is almost always tuberculosis.

*One of a series of lectures and demonstrations to a class of physicians in tuberculosis held under auspices of the Health Bureau, Department of Public Welfare, Richmond, Va., February 15, to April 15, 1923.

5. Hoarseness—This is frequently the first intimation of the presence of pulmonary tuberculosis and may occur for years before other symptoms become manifest. It is most likely to be transient rather than persistent, and frequently is only present after prolonged use of the voice. A laryngological examination is important in these cases.

6. Dyspnea—Shortness of breath is a common symptom among those suffering from pulmonary tuberculosis, and is sometimes the first symptom noticed by the patient. There are many factors that may cause this symptom, and for that reason dyspnea bears little relation to the amount of pulmonary involvement.

Constitutional Symptoms.

1. Fever—An afternoon rise in temperature of one to two degrees or even less should lead one to suspect tuberculosis as the cause. As a rule, rest in bed will cause a lowering or disappearance of fever, in the tuberculous, while exercise produces an elevation. However, temperature of pulmonary tuberculosis may resemble that of pneumonia, malaria, or even typhoid fever, depending on the stage of the disease, resistance of patient, complications, etc. To be of most value in diagnosis, readings should be taken at two hour intervals over a period of at least three days. Remember a normal or even temperature does not rule out tuberculosis.

2. Loss of Weight—A gradual and progressive loss of weight is characteristic of tuberculosis.

3. Intestial Symptoms—Loss of appetite, indigestion, and epigastric fullness usually accompany loss of weight, but all or any may be independent of the others. Either constipation or diarrhea may be present. These symptoms may be present for months before others are complained of.

4. Acceleration of Pulse may be the first symptom of tuberculosis. In these cases the differentiation between tuberculosis and thyroid disturbances is most difficult.

5. Nervousness is a most frequent symptom of pulmonary tuberculosis, and only too often is tuberculosis overlooked as the causative factor. Many so called nervous breakdowns are in reality manifest tuberculosis.

6. Suppression of the Menses may be the first tangible symptom of an oncoming tuberculosis.

History Taking.

The following facts should be obtained as far as possible, it matters not whether you are taking an elaborate history or simply questioning your patient either before or after examining him.

1. Complaints—Ask patient why he came to the office. Without asking leading questions, see if the patient complains of any of the following: cough, expectoration, hemoptysis, loss of strength, pleurisy, indigestion, etc.

2. Family History—Question patient closely as to whether or not there has been a death in the immediate family, and, if so, was the cause tuberculosis. Do not simply take the patient's word for cause of death, but question him regarding symptoms, cause of disease, etc., so as to be, as far as possible, sure in your own mind that it was not tuberculosis. Family history of this disease probably is not a great factor except in the immediate family of the patient, unless he has closely associated with some distant relative who had tuberculosis. Of course, in that case, it is a question of association and not family relationship.

3. Past History—General health; work; when patient began work; type of work; environment; amount of rest patient gets; home conditions; whether or not married; children—how many; past diseases—measles, pertussis, typhoid—these are unquestionably the three most important: measles, due to the fact that it so frequently leaves lung complications; whooping cough, for somewhat the same reason; typhoid has no particular bearing on tuberculosis except that frequently the diagnosis of typhoid is made when the patient was simply suffering from tuberculosis, and a period of weeks in bed was sufficient for the patient to temporarily recover. On the other hand, occasionally a case of typhoid is diagnosed tuberculosis. General questions on the circulatory system—as palpitation of the heart, dyspnea; on gastro-intestinal system—as to appetite, bowels, etc., should always be asked, and any suggestive symptoms should be closely followed up. Of course, questions on the nervous system and the genito-urinary system should not be overlooked, even in a patient known to be suffering from tuberculosis any more than in any other patient.

HABITS—The habits of the patient are most important and are frequently overlooked. Questions relating to the use of alcohol, drugs, and excesses of all kinds should be asked.

EXPOSURE TO TUBERCULOSIS—Has there been any intimate exposure? If so, when, and for how long?

PRESENT ILLNESS—Here we are trying to determine the onset of the disease. When were you last perfectly well; the illness began how and when; acute or gradual? Try to ascertain if illness began with any of the following: cold, grippe, pleurisy, hemoptysis, fever, or simply with fatigue and loss of strength. This is determined in order that we may classify onset of disease under one of the following; *Insidious*—in which the patient complains of fatigue, lack of endurance, as probably the earliest symptoms, and gradually develops other symptoms over a period of months, or perhaps a year or more. *Catarrhal*—here the usual onset is a cold, so-called bronchitis which, in reality, is simply tuberculosis manifesting itself in this way. *Hemoptosic*—here we have frank hemorrhage manifesting itself as the first symptom. In many cases, of course, patient had symptoms but never realized it until after he had had his hemorrhage. *Pleuritic*—here the onset is with pleurisy and frequently pleurisy with effusion, sometimes following pneumonia. *Febrile*—This type is less frequent, and not infrequently the patient comes to the doctor suffering from some condition other than tuberculosis and the physician discovers that the patient has been running a temperature that he cannot account for, and this leads to a diagnosis of tuberculosis. Of course, there are many other ways in which temperatures are discovered, and in an effort to discover the cause the diagnosis of tuberculosis is made.

"It is no exaggeration to state that from the history alone the vast majority of cases of early tuberculosis can be recognized definitely, or at least the presence of the disease can be strongly suspected."*

*Quotation from Norris and Landis book on Diseases of the Chest and the Principles of Diagnosis.

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DIET IN TUBERCULOSIS.

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If there is one thing in particular that has been neglected in the treatment of diseases, it is diet. Tuberculosis is no exception to this rule; in fact, we might even say that the diet for tuberculous patients has not only been neglected but abused as well. This abuse, which was intended to accomplish much good, was the result of an accepted theory regarding its treatment. In consumption there is a great wasting away of tissue and, because of this fact, it was thought that a heavy diet, consisting usually of excessive amounts of protein, would correct this condition by replacing the lost tissue. Our ideas, however, have changed quite materially in the therapy and diet of tuberculosis and rest is now considered the first essential in its treatment. With this thought in mind, I shall try to show how the best results may be obtained by a properly regulated diet.

Diet, for the normal man as well as for those suffering from disease, has been given very little attention in the past and we have only to look about us to see the results of such carelessness. The digestive apparatus of the average American has some impairment or definite loss of function. Rheumatism, arteriosclerosis and many other diseases are traceable to a faulty diet. There is no land on the globe that has the great variety of food that we have from which to select and none could have a more perfect diet. The lack of interest, almost utter indifference to the whole subject, seems to arise from the very fact that our food resources *are* so abundant. Also, many of the foods that we do use are spoiled in preparation, to say nothing of the vital elements that are wasted by boiling and discarding the juices.

It was found at the Phipps Institute in Philadelphia, that 80% of tuberculous patients showed some impairment of kidney function. A less percentage showed definite tuberculous involvement. We know that the kidneys are one of the most important excretory organs of the body and any impairment of their function is sure to have an effect on the elimination of poisons that are so numerous in tuberculosis. The unusually high protein diet, generally used in the treatment of this disease, is a direct tax on the excretory organs and also has a definite relation to the metabolic rate, of which I will speak later. The liver is another vital organ for the excretion of waste products and we find it also very often impaired in function.

I am sure that you are all aware of the experiments with low protein diets that were made some years ago by Chittenden of the Yale Scientific School. He selected several professors, college athletes and a group of soldiers, loaned by the Government for this purpose. From the experiments, which were conducted over a period of several months, he found that less than half the accepted amount of protein is sufficient to keep the body in vigorous activity and good health. Such experiments have been repeated many times since and the accuracy of Chittenden's findings, proven beyond a doubt. We only need to observe the Chinese coolie to understand that high protein is not essential to endurance. Those men run for hours throughout the day with their rickshaw loads and never tire. The same is true of the natives of India. They run for miles without ever tiring and their diet is essentially a very low protein one. The Japanese soldiers out-marched any others during the Russo-Japanese War and their diet is noticeably low in portein, meat being eaten only occasionally.

Dr. R. A. Kocher reported in the *California State Journal of Medicine* some metabolism studies that he had made on pulmonary tuberculosis at Trudeau Sanatorium, Saranac Lake, New York. In brief, his conclusions were as follows: In fifteen cases of afebrile pulmónary tuberculosis, eight of which showed active lesions, the metabolism was basal, that is, within a few per cent above or below the average normal. On two patients the effect of giving a meal of 400 grams of lean beef was determined.

The metabolism was raised 25 to 30 per cent, due to the so-called specific dynamic action of the protein. The effect of a high caloric diet on the rate and depth of respiration was determined. A mixed meal of one thousand calories increased the ventilation of the lungs, measured as minute volume, 18 to 20 per cent. These facts prove that a high caloric or a high protein diet have the same effect as muscular work on the patient and, as rest is the chief factor in the treatment of tuberculosis, we defeat our purpose when we feed excessive amounts of protein, thus greatly overtaxing the lungs; the very organs that we are most anxious to have at rest. Janney and Newell have shown that cases of pulmonary tuberculosis complicated by diabetes, or *vice versa*, are favorably influenced by the state of undernutrition resulting from a rigid adherence to the proper diabetic diet.

To quote further from the experiments of Kocher at Trudeau, with relation to the creatinin co-efficient, we find that four subjects were selected and the creatinin co-efficient was studied, first on a low, then later on a high protein diet, over an extended period; starting from early convalescence, when the patients had just completed the bed rest, through a period of moderate exercise. At the time muscular activity began, the creatinin co-efficient was uniformly low. With the increase in weight, the co-efficient was practically stationary or even decreased on a low protein diet, where there was a substantial gain in weight. It is plainly evident that the gain in weight was a gain in adipose and not in muscular tissue. During the period on a high protein diet, when the patients were on moderate exercise, there was a very decided rise in creatinin co-efficient in every case. This showed that there had been a nitrogen retention and synthesis of new protein, or active functioning in muscular tissue. We have then, in creatinin estimation, a simple means of determining, at any time, whether a patient is making a substantial, or only a spurious gain. The creatinin output is the index of the functional efficiency of the body. We learn from these facts that superfluous fat merely adds to the metabolic rate and respiratory rate without adding to the functional efficiency of the organism.

Uhldom claims that passive congestion of the liver is found in nearly every case of tuberculosis. This, of course, is a result of diminished respiratory function which, he says, is brought about by the fact that the venous circulation of the liver is influenced largely by the movements of the diaphragm and he claims that it is possible to have this movement diminished and yet have more rapid respirations.

Dr. Lawrason Brown warns against high protein diets, claiming that they do not lead to permanent results and success and are likely to give rise to toxic action of the liver and kidneys. Again, he has shown that a diminished alkalinity of the blood stream does not favor the healing process and this condition is brought about by using high protein dietaries, especially those with an excess of meats.

Degeneration of the thyroid gland, concurrent kidney diseases, disease of the adrenals, all show some relation to the tuberculous pro-

cess and the foods ingested. We should understand then, that the diet in tuberculosis should be given careful thought and attention and, if we wish to save the body as much energy as is possible and facilitate the healing process, we must use every precaution to eliminate anything that will tax the system unnecessarily. Care should be given to the teeth as it has been found that many of the cases that have been starved of lime for long periods are those that have very poor teeth; consequently, the powers of mastication are impaired, resulting in poor digestion. The digestion of proteins is mostly in the stomach and the action of the ferments found there is greatly enhanced by the presence of some alkali like that which is found in the saliva.

Attention should be given to the intestinal tract. The intestinal flora is of such a character that putrefaction is inevitable if this organ of elimination is neglected. It is not necessary to go into detail to prove how injurious such neglect may be to the entire system. Buttermilk prepared with B. Acidophilus will help greatly to correct any condition of the intestinal flora that may result from such carelessness. This will also often relieve much of the constipation that exists in this disease which is, of course, a direct menace to the progress of the case.

Now that we know what may be expected of the ordinary case of pulmonary tuberculosis (which may be summarized generally as impaired organs for the elimination of waste products, caused by the foods ingested) we should understand that the course which should be followed in diet is to use only the minimum amount of food and especially a restricted protein dietary. The diet of our sanatoria throughout the country is all, more or less, at fault in this respect; though many are showing some progress by discontinuing the usual nourishment between meals. Most patients are firmly convinced that they must eat large portions of meats, eggs, and milk in order to get well. This is not true but it will require much time and education to change such erroneous ideas. Many of them do not feel that they are making any progress unless they are gaining a considerable amount in weight. It is well, of course, to gain a certain amount but excessive weight is burdensome besides being a hindrance to the success of the cure. It is far better to gain slowly, at the same time gaining strength, than to gain large amounts of adipose tissue and no strength. An effort should be made to gain from about five to ten pounds in excess of a patient's usual weight, not the estimated weight for height and age. Always remember that high caloric value of foods increases the metabolic rate, consequently increasing the respiratory rate with a lessened amount of rest to the diseased lung, the very thing about which we are most concerned.

Too much care cannot be given to the amount of protein used in the diet for tuberculosis. It should be rich in fats and carbohydrates, vitamines, iron and lime, a minimum amount of protein with sufficient bulk to insure two bowel movements a day. During the active stages of the disease, when there is a great body loss, more protein should be fed than later when the disease is arrested, but this should never be in excessive amounts as is now practiced so freely. If it were possible to obtain and prepare the protein for this purpose without using meats, we would make another great advance in this most important branch of tuberculosis therapy.

Some of the advantages of a vegetable, over a flesh protein dietary are as follows: vegetables do not readily undergo putrefaction and decomposition. Flesh proteins contain a great amount of toxin that is present from the usual metabolism going on in the body of the animal at the time it is butchered and putrefactive, as well as other organisms are allowed to grow to enormous amounts. These affect the intestinal flora and favor autointoxication. However, at this time, it is not possible to change from one to the other in the ordinary home or many of our sanatoria because they are not prepared to offer proper substitutes; not that we lack such materials but the majority of people are not educated in their use and selection. It is needless to say that whatever protein we do use should be in as small amounts as possible. An increased amount, as is customary, involves grave dangers to the patient by decreasing his vital resistance and imposing unnecessary burdens on the excretory organs which are already overtaxed and often seriously crippled. Men who have been associated with this work for many years have given us definite evidence that patients receiving high protein diets do not make the best progress. The additional toxins that result from excessive amounts of protein, together with those of the

tubercle bacillus, materially handicap the healing ability of the blood stream by reducing the alkalinity of this fluid.

We shall now consider, more in detail, some of the various food principles that are necessary to the normal organism as well as to the diseased one. As a rule, only a slight change in the amounts is necessary to adapt them to all conditions.

During the stage when the patient is having active symptoms, the diet should be of a different character than when the case is quiescent and the patient is exercising. Three meals a day are usually quite sufficient but, if the digestion is impaired greatly, it will be found necessary to feed oftener. Foods requiring little effort on the part of the body to assimilate them are the most advisable. While in the arrested stages, the diet may be largely that of the normal person, the meals should have as much variety as possible and should be spaced about five hours apart. If the patient is forbidden food between meals, his appetite will be more acute at the regular meal time and he will doubtless eat more than he otherwise would. From observation, I have found it most interesting to note that very often the case that complains of a loss of appetite is one that is gaining steadily; making it very evident that, previous to that time, he or she had been eating too much. This has been a great help in preaching the principle of a low protein diet, because the patient unconsciously proves to himself the disadvantages of overeating.

McCann and Barr, of the Russell Sage Foundation at Bellevue Hospital Medical College of New York, have shown in their metabolism studies of pulmonary tuberculosis that the amount of food required by the consumptive need not be more than 20 to 25 per cent above that which is required for a normal person, about 500 calories above that required when at rest.

Much of the natural salts, as iron and lime, are lost in our modern methods of cooking. This is largely due to boiling vegetables and throwing away the water which has absorbed a large proportion of these most vital elements. We know that in the healing process of the most favorable cases much calcium is deposited in the tubercles. The usual diet for ordinary needs is, as a rule, low in calcium and this is greatly decreased when an extra amount is required for deposition in the tubercles. Milk which contains much lime and should be used freely, together with greens, buttermilk, whole wheat breads, cottage cheese and soy beans, contain 99% of the day's supply of calcium. Meats, as a whole, are deficient in this salt element.

In a man weighing 150 lbs., we find 1 oz. of iron and there is a loss of about 1/7 of a grain of iron each day in the usual functioning of the body. As we know, this important element is needed to make hemoglobin, without which bodily activity could not continue. It is not possible to take this iron into the system in the form of inorganic iron and it has been found that the usual medicaments containing such iron are not as easily assimilated as they were thought to have been, so the chief amount of this iron must be supplied by foods and taken into the system through organic action. In tuberculosis, where there is lessened space in the lungs for the exchange of gases, it is most important to have the highest number of red cells possible to facilitate the combination of CO_2 with oxygen. Natural food stuffs contain this iron in the best form and the one that can be absorbed easiest. When we consider the amount of iron, or percentage of the day's ration, contained in one ounce of material, we find that the legumes (averaging 11.35) produce more than we get from any other source. Greens contain 4.29, cereals 3.9, nuts 3.49, eggs 5.67, fruits 1.74, vegetables 1.46, milk products 1.05, and milk .47, or less than half of one per cent of the daily requirement. Considering the per cent of iron per 100 calories of food, we find that greens come first with 46.4, then meats with 15.6, legumes 13.7, vegetables 10.4, fruits 5.6, cereals 4.3, nuts 2.67, and lastly eggs 1.36.

There is not much use of elaborating on the vitamines in general. We know that there are three chief varieties; the fat soluble "A," which has to do chiefly with growth; water soluble "B," or the one that gives rise to beriberi; water soluble "C," or the antiscorbutic vitamine. Boiling and baking damages these vitamines, so, to insure the proper amount of them in the dietary, a certain amount of raw food stuffs should be eaten each day. In general, fats and oils are rich in the fat soluble "A" and almost nil in the other vitamines. Meats, fish and milk products are more or less divided equally among the three vitamines and cereals

and vegetables have the greatest amount of the antiscorbutic factors. Alkalies destroy vitamines as does the high milling of cereals. Antiscorbutic factors are damaged at the usual temperature of pasteurization of milk. New processed corn meal is deficient in this respect and, to a certain extent, may be the cause of pellagra, for this disease is not found in mountainous regions where the farmers are still grinding their grain on the old burr mills, thus preserving the outer coating of the grain which contains a liberal supply of vitamine. The tomato is perhaps the best single source of vitamine that we have, for it contains all three varieties; therefore, it should be used extensively. The acid is not injurious as it was once thought to be. The potash salts, of which it contains more than most fruits and many other vegetables, tend to alkalinize the blood stream.

Cereals, which are one of the most important sources of foods, have been used for ages but, like many other foods, have suffered much at the hands of modern methods of preparation; for instance, rice is polished, destroying the outer coating and, when eaten alone, is apt to cause a deficiency disease as beriberi. Wheat and other cereals are highly milled, removing the outer coating and destroying the part that contains the salts and life-giving properties. The Scotch use oats as a cereal almost exclusively. They consider scalding the proper method of cooking this grain and, because of this, none of the nutritious elements are lost in preparation. This, together with their buttermilk, has made them a very healthy race of people. We should profit by this knowledge and cultivate a greater liking for such simple foods. The protein of cereals is very good and easily digestible. More whole wheat bread, which contains much bran, would eradicate much of our constipation.

Vegetables are used far too little in the national dietary and we should eat more of them than is customary. The white potato, which is used far too little, is a valuable source of food. The majority of uncooked vegetables should be put through some sort of cleansing process before being used as they are often contaminated by many kinds of bacteria. The taste or quality of the food is not affected by using a weak solution of lye or hydrogen peroxide. Vegetables contain mostly water and their chief use is to supply carbohydrates, alkaline salts, vitamines and cellulose. Starch is the basic substance of the carbohydrates and, in this form, is most easy to assimilate.

Legumes are very rich in lime, iron and vitamines. The protein in them is inferior in quality to that which is found in meats, milk, eggs, cereals, potatoes and nuts. The soy bean is not included in this category for its protein is of a high quality. Perhaps the reason for the difficulty in digesting them lies in the fact that they are not carefully chewed before swallowing and the close network of cellulose, enclosing the protein substance, is not acted upon in the stomach but in the intestines. These beans should be cooked quickly, instead of over long periods, and this is more easily done with superheated steam than by other methods.

It is hardly necessary to say much about fruits. They are one of the most readily absorbed forms of food and are rich in vitamines and salts with starch and small amounts of protein, of which the apple contains most and, when sufficiently ripened, requires practically no digestion whatever. They are most valuable for cases that are unable to take much solid food. Fruit juices should be used frequently. The acid of fruits, which has been thought detrimental to our balance of alkali and acid in the body, has been proven to be very valuable in alkalinizing the blood.

Nuts are used more as a dessert but, as they are rich in excellent protein, fats and mineral salts, their great food value should be recognized and their use made more common. One pound of walnut meat is equal in food value to from three to twenty-five times as much as any other food or meat except nuts. An almond milk can be prepared by grinding the meats and slowly emulsifying them with water to the consistency of milk. This closely rivals cows' milk and is a good substitute to use for the cases requiring this form of nourishment that have tired of the cows' milk.

Animal foods are considered the chief constituent of our daily diet and it is needless to say that they have been used far in excess of their requirement. Plants are food producers and animals are food users. I have mentioned before that, at this time, it is not advisable to swing from a meat to a strict vegetarian diet, but it is my thought to promote and encourage a much lessened meat diet than that to which we are accustomed at the present time. Meat is chiefly protein in nature and practically all of

it is absorbed but, as the body can handle only a certain proportion of this, the excess is a direct poison to the system which the kidneys and liver must eliminate. We have already seen how greatly over-worked those organs are and we know that they should be saved all unnecessary effort possible. Beef, mutton, fish and fowl are all quite easily digested and, when used as the sole source of protein, their daily requirement, for the average individual, is about one to two ounces.

Animal products, such as milk, eggs and butter, have been considered for ages some of our chief sources of food supply. In milk we have an almost complete protein. Vitamines, organic salts and so forth are there in abundance. This protein is of excellent quality and is more easily absorbed than any other. If taken with vegetables and cereals, we have no need for further food articles. The lime content is higher in milk than in any other single food element. Cottage cheese, buttermilk and similar products furnish not only a good grade of protein but also help to acidify the intestinal flora which is usually teeming with putrefactive bacteria that are apt to lead to many ills. Milk and eggs furnish an excellent form of nourishment for the case that has poor digestion and requires frequent feedings. The whites of eggs are more digestible when only slightly coagulated (as in poached eggs) but the yolk should be thoroughly cooked. Milk is intended to be a perfect food, that is, it has the various elements necessary for the life of the young. It is not necessary to mention that milk should be obtained from tuberculin-tested cattle and, if the facterial count is very high, it should be pasteurized before using.

In conclusion then, we would say that the diet in tuberculosis should be that of a low protein ration in general and that the protein which is used should be preferably that which is found in milk, vegetables, eggs and fruits; using only as little meat as is absolutely necessary. Increased ingestion of proteins, or high caloric diets, increases the basal metabolic rate of the body with a consequent increased respiration, giving more work to the lungs which are the very organs that we are most anxious to save any unnecessary labor. It also gives extra work to the excretory organs, as the kidneys and liver, causing definite impairment of function in a large majority of cases.

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NERVOUS, MENTAL AND ENDOCRINE MANIFESTATIONS IN MENOPAUSE.*

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The normal menopause, or "third phase of life," is accompanied by a train of annoying symptoms that are well known, yet there are a number of cases which become pathologic, possessing varied nervous, mental and endocrine conditions which not infrequently enshroud the approaching change in such a manner that diagnosis is difficult.

The age limit of occurrence may be said, generally speaking, to be between thirty-five and fifty-five; about fifty per cent. taking place between forty-five and fifty, twenty-five per cent. between forty and forty-five and most of the remaining twenty-five per cent. above and below the limit given. One often encounters menopause occurring early in life and, on inquiring into the family history, finds the condition to be familial. Less frequently the onset takes place after the age of fifty-five. It must not be overlooked that artificial menopause from partial or total oophorectomy bears the same marks as that of physiological menopause and should be included. The average age of the true climacterium according to Sanes[1] in an analysis of the literature from thirty-two nations, is 47.1 years.

Concerning the physiology of the ovary, we believe that there are at least two internal secretions, one the corpus luteum derived from the Graafian follicles after their rupture, the other the interstitial secretion derived from the interstitial cells. However, the exact chemical substance or active principle, according to Vincent[2], like that of iodine from the thyroid and epinephrin from the adrenals, is unknown. It is probable, as suggested by Gustave Bond, that corpus luteum contributes to the fixation of the impregnated ovum and the experimental work of Marshall and Jolly[3] would seem to confirm this. These investigators extirpated the ovaries of dogs known to be pregnant and in every case but one pregnancy was discontinued. It is also said that injection of corpus luteum inhibits ovulation. The general view now held by most writers is that the interstitial cells control the nutrition of the reproductive organs and contri-

*Read by title before the Southside Virginia Medical Association, September, 1922.

Read before the Richmond Academy of Medicine and Surgery, June 12, 1923.

bute to the development of the secondary sex characteristics. Experimental castration tends to bear out this statement.

I have ventured to call your attention to the normal function of the ovaries and mention several facts concerning the interruption of this function. Such an interruption is evidenced by the approach of menopause and by the castration of women. A dysfunction of the ovaries is brought about by the menopause. Should pathological conditions exist, the organisms fail to respond, or should it become over-active, then certain syndromes follow unless there is a physiological adjustment.

While the symptoms of the various types of menopause over-lap there are certain syndromes which are outstanding and suggest to us the following classification:

I. Normal Physiological Menopause. The onset of this class occurs between the ages of forty-four and forty-seven with gradual decrease in menstrual flow until cessation. Next in order of frequence are the vasomotor symptoms which usually come on shortly before permanent amenorrhoea is established. These consist of hot flushes, sweating, faintness, vertigo, "crawling sensations," cold clammy feet and hands and epistaxis. Intestinal symptoms are not uncommon. Emotional upsets and apprehension are frequent. This type usually has a good physical status and has been a stable individual throughout her life, possesses a strong resistance and is able to throw off untoward symptoms. The degree of intensity of the manifestations varies, and a number of women pass through this phase almost unmolested. Increase in body weight, atrophic and fibrous changes and gland cell obliteration mark the close of menopause and the beginning of the senile era. Little or no treatment is needed.

II. Castrates—Partial and Complete. Artificial menopause is usually produced between the ages of twenty and forty-five on account of the existence of some functional or organic surgical condition. Most frequently it is followed by a period in which there is an amelioration of the patient's symptoms after which the onset of the menopause syndrome is very sudden and accompanied by various physical, nervous, mental and endocrine upsets. Menstruation stops completely except in cases where the uterus and an ovary, or part of an ovary, are left intact. The usual menopause symptoms are somewhat exaggerated. General or localized obesity begins, the skin becomes smooth and soft, frequently losing much of its pigment, and the growth of the head hair may become luxuriant. In the younger individuals there is often a change in personality. They become "flashy" in their dress, loud, talkative, silly and appear to be more easily attracted by their opposite sex. Vincent states that after castration there may be a temporary increase in sexual desire. The change in personality is somewhat similar to the precosity of adolescence and may be due to endocrine imbalance. Atrophic changes of the genital organs and mammary gland usually follow, though the latter occasionally hypertrophy, a condition often confused with obesity of the breasts. It is said that an increase in the growth of hair on the face and other portions of the body takes place; however, this may be evidence of adrenal involvement. Male secondary characteristics may develop especially during senility, numerous cases having been reported.[4]

III. Nervous Symptoms Associated With Menopause. It may be said that the greatest percentage fall under this class. The principal symptoms complained of are tachycardia or bradycardia, headache, vertigo, insomnia, irritabilty, tremors, functionally exaggerated reflexes and paresthesias, of which numbness and tingling are most common, and not infrequently pruritus. The vasomotor disturbances probably have a close relationship to the nervous manifestations, especially the paresthesias. The mechanism is probably through the sympathetic nerves of the arterioles and the capillary reflex arcs.*[5]

IV. Mental Symptoms Associated With Menopause. A number of climacteric cases show mental symptoms, while in the neighborhood of thirty to forty per cent. have psychic manifestations of a milder degree and will be discussed in a later paragraph. In some of our series definite psychoses have been noted. Mental symptoms such as depression, excitement, visual and auditory hallucinations, delusions of persecution, sense of unworthiness, suicidal tendencies, violence and maniacal states have been observed. Those cases showing psychic changes often have apprehension, phobias, emotionality, instability, are self

*Wright believes that on stroking the skin lightly a white line appears, while deeper pressure brings forth a red line. This phenomenon is analogous to the vasomotor flushings and blanching but being produced by local stimulation and is due to the degree of stimulation of the capillaries.

centered, anxious and possess what are termed "envies," or "inclinations" similar to those occurring during pregnancy. The lack of gratification of these inclinations sometimes leads to anxiety states. A thorough investigation of the patient's past mental history, family history and psychic stability is all important. Some cases have had recurrent depressive psychosis, some mixed manic psychosis, and others anxiety and varied psychotic states previously, and it is in these cases we feel that menopause is contributory only as an exciting cause. The patient possibly has a lowered resistance and generally has a psychotic constitutional or hereditary make-up. Mental disturbances associated with menopause sometimes clear up in a relatively shorter time than true psychoses.

V. Endocrine Disturbance Associated With Menopause. Since we have concluded that the ovary is an organ of internal secretion which is essential to the body, we must further conclude that all menopause cases become endocrinous because of the withdrawal of the ovarian secretion. Atrophic changes of the gland begin to take place, menstruation slows down and finally permanent amenorrhoea is established. E. Novak[6] states that not infrequently is there an increase in menstrual flow during climacterium associated with endometrial hyperplasia and probably due to hypersecretion of the ovary, even in the demonstrable absence of anatomic diseases. The writer believes that this functional bleeding may be greatly influenced by increased activity of the anterior lobe of the pituitary or a hyposecretion of the thyroid gland which is secondary to ovarian hypofunction. Atrophy of the external genitalia, the uterus and at times the breasts, are other signs of ovarian deficency. Atrophy of the ovaries, sclerosis or cystic formation may take place. On the other hand obesity changes are observed and may be general or localized. Abdominal obesity and trochanter padding are attributed to ovarian hypofunction while other types are said to indicate involvement of the pituitary or thyroid. This increase in fat is in all probability due to lowered metabolism. The body hair is often scant and pigments may be lessened. The patient is frequently languid, sluggish and drowsy.

There seem to be secondary changes, especially in the pituitary, thyroid and adrenal glands during and following menopause. Tucker tells me that he has observed certain acromegalic changes such as enlargement of the superior maxillae, clubbing of the fingers, broadening of the hands, etc., in some of these cases and in 1917 Emil Goetsch[7] mentioned that definite hypertrophy of the pituitary gland and enlargement of the sella turcica followed castration both in the humans and other animals. In other cases hyposecretion of the posterior lobe of the pituitary is evidenced by the obesity of the breast girdle and flank padding and increase in the size of the extremities, sparse body hair distribution, scanty perspiration, decreased involuntary muscle tone, subnormal blood pressure, temperature and pulse rate and lowered metabolism.

Thyroid involvement is frequently associated with menopause changes, the characteristic hypothyroid features being dry, scaly skin, slow pulse, low blood pressure, obesity about the face, chin and neck and dry hair. These patients are sluggish and complain of constipation. This type occurs more frequently between the ages of from forty-five to fifty-five in contrast to those who show hyperthyroid symptoms in which the onset of menopause is between thirty-five and forty-five. In the cases of over-secretion of the thyroid, obesity is usually absent, the patient is slender, the pulse rapid, perspiration free, vasomotor symptoms exaggerated, tremors in evidence, and nervous manifestations such as irritability, restlessness and phobias are present. Here we not infrequently find foci of infection as a contributory cause. The blood pressure may be elevated.

Association of adrenal involvement is not uncommon. Low blood pressure, increased pigments, increase in face and body hair and asthenia are said to be indications of hypoadrenalism. This condition is sometimes accompanied by mild depressive phases. Increased blood pressure, irritability and nervousness are evidences of hyperadrenalism. We have noticed that in some of our menopause cases with hypertension the administration of ovarian extracts caused a definite lowering of the pressure. Other organic causes contributing to the elevation of the blood pressure should be eliminated before attributing the rise to increased adrenal secretion.

VI. General Pathological Conditions Associated With Menopause. The physical

condition of the patient at the onset of menopause is important and apparently bears a close relationship to the difficulty that is encountered by the individual in passing through the "third phase of life." Focal infection, whether it be teeth, tonsils, fistulae, or what not, seems to contribute largely to the involvement of endocrine system, urinary system and joint conditions. Hyperthyroidism and hypoadrenalism not infrequently follow infected teeth and tonsils. Other causes which tend to lower the resistance are cardio-vascular diseases, and chronic pelvic conditions, especially those of inflammation. With a lowered resistance, a fertile field is produced and the individual is susceptible to almost any disease. It is here that we must not overlook the fact that the close of the menopause marks the beginning of senility. Elimination and treatment of diseased conditions during this period seem to be an ideal time to attempt prevention of the infirmities of old age.

The prognosis of menopause cases, where organic diseases have been excluded, may be said to be good. Seventy to eighty per cent. of these recover, becoming stable and useful women. With castrates the outlook is less encouraging. They continue to be nervous, have vasomotor symptoms and the onset of pathological conditions is difficult to ward off. Those with nervous manifestations can be controlled to a great extent. In those who have a mental disturbance there is a tendency to recurrence or a continuation of the psychic instability with the development of a psychoneurosis, and recovery in most cases is slow. Those showing definite endocrine conditions improve greatly while the doubtful ones respond poorly. Symptoms of organic conditions may be alleviated to a moderate degree but in many cases are not especially satisfactory.

Specific organo-therapy is of great value and should be used in those cases experiencing any difficulty. It is particularly useful in the amelioration of vasomotor symptoms. Good results have been obtained from the use of corpus luteum, whole ovarian extract and ovarian residue. It is difficult to suggest the dosage because of the lack of standardization by the various manufacturers. The usual amount given represents five grains of the dried extract administered three or four times daily. The extracts may be obtained in tablet and capsule form and a soluble extract in ampules for hypodermic injection. In our hands we have obtained the best results with the use of one ampule of the soluble ovarian extract given hypodermically three times a week, or daily, for a period of two to six weeks and followed by the extract in tablet form, five grains three times a day, over a period of one to three months, or longer when indicated. In cases where prolonged dosage is necessary, it is well to give the extract on alternating weeks or months, other symptoms being treated according to their nature. In many cases the use of ovarian extracts is surprising and usually very gratifying.

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NUTRITION AND LIFE.*

By. LAWRENCE T. ROYSTER, M. D., Norfolk, Va.

You have honored me with an invitation to address you this evening. I have accepted because of my appreciation of the honor; because I hold the practitioners of orthodontia in high esteem and because I think the medical and dental professions should work in close and cordial co-operation.

The strides which have been made in medical and allied sciences in the past twenty-five years well-nigh stagger our sensibilities when we make even a casual survey of the progress of this period; in fact, the panorama is now passing before our eyes with such amazing rapidity that no man can maintain even the most superficial acquaintance with all the branches, and must of necessity restrict his reading to more or less narrow lines and con-

*Delivered before The Eastern Association of Graduates of the Angle School of Orthodontia, at Norfolk, Va., March 24, 1923.

centrate his efforts to a limited field. If we consider this discovery as prophetic, it requires no stretch of the imagination to see that the medical student of the near future must determine at some time during his college course which branch of the profession he will follow, and complete his course with that end in view.

For example, he must determine before graduation whether he will choose internal medicine, surgery, obstetrics, pediatrics or dentistry, with its subdivisions, oral hygiene, oral surgery or orthodontia. You will notice of course that I have placed dentistry in the curriculum of medicine, and this is as it should be.

Whatever branch of the healing art, with its prophylactic, corrective or curative phases, is chosen, an intimate knowledge of the fundamental sciences is absolutely essential to the production of the highest type of professional man.

This vast increase of knowledge with a consequent diversity of interest has developed the specialist, highly trained and exceptionally proficient in a more or less limited field, with the result that all specialties are dependent on each other. Out of this condition has arisen the popular group practice so familiar to us today. Whether group practice is conducted by a number of men closely associated through business affiliation, or whether the opinion of several different men, not actually associated, is sought in the diagnosis of a single case, the effect is the same. Regardless of how well specialized one's knowledge and experience may be, it is necessary that there be the same training in the fundamentals and sufficient understanding of the work of the consultant, in order that his findings may be interpreted intelligently.

But let us bear in mind that specialism is apt to narrow vision as well as activity. Are we not apt to become so intent on the problem, whether it be diagnosis or cure, that we lose sight of the relation of the immediate condition to the individual, and in turn, the individual to society? Are we not apt to content ourselves with the relief or amelioration of the acute condition and forget to consider the future carrying-on power of the patient?

The specialty which requires the broadest vision of life is, perhaps, pediatrics. Not pediatrics as usually defined as "the study and treatment of disease as manifested in children," but rather a much broader conception—the making of the best possible citizen out of the material as it comes to us during childhood Diagnosis and treatment of acute conditions alone is not sufficient. To be sure we must treat and aid in the cure of acute disease and save life, and this must be our immediate care; but do we fulfill our duty if we discharge the patient at this point? Most assuredly not! Have we determined what bearing the acute condition has on the future health and earning capacity of the patient? Have we taken advantage of the opportunity thus afforded for a thorough examination with a view to determining his state of nutrition, mental status, condition of tonsils, whether teeth are decayed or maloccluded, and in fact everything which may in any way affect the future of the patient? If we have not done this we have failed in our duty.

Pediatrics, then, in this broad sense is not limited to the pediatrician, but must include the obstetrician, who cares for the child *in utero* through its mother; the family physician, who of necessity treats a majority of the children, and observes the health of the other members of the family which may in turn affect that of the child; the surgeon who operates for an abdominal infection or a hernia; the orthopedist who corrects deformities, thereby making a self-supporting individual out of one who might otherwise become a crippled dependent; the orthodontist, who corrects malocclusions, thus not only preventing early loss of teeth through disuse, but also changing a repulsive countenance into a pleasing one, an important economic factor.

I have said that the pediatrician should concern himself with making the best possible citizen out of the material as it comes to him during childhood. The importance of this phrase must be stressed. According to the laws of biology and heredity, all the possibilities of the adult structure are inherent in the cell at the moment of fructification. Heritable factors we cannot alter but nutrition, on which their development depends, we can control.

The newer knowledge of the chemical composition of food and its relation to the animal economy and the results produced by intelligent application of this knowledge may in truth be termed the "science of nutrition," while the employment of the recently discov-

cred vitamins in promoting growth and development and in correcting abnormal states suggests the term "wizardry of nutrition."

When we observe cases of rickets developed in breast-fed infants, who have been reared in an unsanitary environment and suckled by a mother whose food has been poor in certain food elements, or more frequently, an infant fed artificially on a food poor in these elements, and see this child gradually overcome the rachitic deformity through either the application of sunlight, or the administration of cod-liver oil, or more quickly by both; when we see an infant, who has been fed on condensed milk, or certain dry products high in carbohydrate and poor in fat and protein content, or an insufficient supply of cow's milk, swollen, tender and racked with the pain of scurvy, relieved by the administration of the juice of a few oranges; when we see the symptom complex known as pellagra, with its eruption, wasting, diarrhea and mental disturbance, change from a state of apparent hopelessness to one of comfort and happiness through the administration of a well-balanced ration, particularly one rich in protein; or a pitiful and helpless neuritic of the beri-beri type restored to usefulness and contentment through the administration of the polishings of rice; or again witness the cure of a xerophthalmia (formerly considered infectious) through the administration of a small amount of cod-liver oil, we are almost convinced that the day of miracles has not passed or that necromancy has returned.

Or let us observe the malnourished school child, that child who is fidgety, unable to concentrate, who becomes easily fatigued, is fractious and impatient under restraint, cross with his companions at play, and lags behind in school work, and with all is considerably below the average weight for his age and height; or that other child who has a peculiar temperament and in whom we recognize there is something wrong, though nothing tangible is present except perhaps decayed or irregularly shaped teeth to point to a malnourished state in the past. It is most interesting to see these children change into perfectly normal ones in a remarkably short time through the prescribing of a rationally balanced diet *at regular intervals*, combined with the regulation of habits of life, particularly a sufficient amount of rest. Sometimes in these cases the diet is rational and results may be obtained by simply regulating the hours, putting a stop to eating between meals, thereby creating an appetite which induces the child to take a sufficient amount of food at meal-time.

To be sure the picture drawn above may result from chronic infections, from teeth, tonsils, etc., and it is presumed that these defects are to be corrected. The same picture with or without low-grade fever may be produced by tuberculosis, and the utmost care must be taken to rule out this condition.

The question naturally arises why the people of former generations and more remote periods of civilization did not suffer from these nutritional disturbances. The answer is paradoxical: They did, and they did not. Some of these conditions have been coexistent with history, some have developed in the course of, and as a result of the progress of civilization When our domestic animals ran wild and roamed the plans they were compelled to forage for their own food, and this they did with a selective instinct and chose what was good for them and produced the best milk for their offspring, and with almost unerring accuracy rejected what was useless or positively harmful in open seasons. During the rigorous seasons, however, they were often compelled to eat whatever could be found, and as a result many fell victims to a general state of malnutrition. Likewise as they became domesticated as the servants of man their food was selected for them. Instead of the plains and fertile fields they were restricted to the narrow confines of inclosed pastures and compelled to subsist on whatever vegetation could grow there, and when this failed, on dry provender which deteriorated from drying and aging.

So it has been with man. We see him during his savage and semi-barbaric existence, feeding on fresh vegetation in its natural state and on animal food which was consumed almost as soon as it was killed; and having no fixed habitation he moved when food became scarce in one locality to a new home where food could be secured with ease again. And even when grain was first used in powdered form it was milled in a mortar just before cooking. So as civilization advanced through a slow and steady development the food question changed but little until man began to live in cities. Till then, he was troubled little by the problems of nutrition except during times

of famine, drought or war, when the food supply was all but cut off, and invariably under these conditions scurvy developed. Even in the early stages of urban life proximity to the country districts made it easy to obtain the necessary provender within a few hours of production. It was in about this stage of civilization economically, though not socially, that the early settlers in this country found themselves, and so they lived until density of population and economic conditions favored a change which was far more abrupt than any which the world has ever known.

This period of comparative simplicity of living has occupied the greater proportion of civilized life on the American continent. Meat was secured by hunting, or later, by the slaughter of domesticated animals as the need arose, and consumed while fresh because of lack of facilities for keeping, and what small quantity was kept was preserved by a process of smoking which retained the nutrient qualities that would have been destroyed by aging. Vegetables were consumed within a short time from gathering; dairy products were utilized almost as fast as they could be produced and prepared for the table, while grain was harvested and garnered in comparatively small quantities, and milled within walking distance of its source and consumed as soon as milled. And of as great importance these forefathers of ours were housed in primitive structures which prompted an outdoor life in mild weather and were exceedingly well ventilated in winter, for it must be recalled that the almost airtight and overheated homes with which we are familiar are of quite recent development.

But gradually and inevitably increase in population, change from country to city life, and rapidly developing economic exigencies wrought their changes. The vast majority of heads of families ceased to produce their food and depended on the purchase of such commodities as were needed from the small farmer, who, as he rose in the scale of production, grew crops of limited variety, eventually restricting his efforts to the output of a single article. The farm receded farther and farther from the center of consumption, thereby causing delay in transit and the necessity for storage with its consequent aging. Grains of every kind, instead of being produced, milled and consumed within a radius of a mile or so, are sent several thousand miles and returned to be consumed, after months of delay, thus impairing the vitamin values of the fresh product.

With civilization also came a departure from the simple life, with its simple tastes, and certain refinements of diet were demanded by the upper classes, and this was quickly imitated by the humbler classes, so that white-flour bread, almost devoid of anything but the starchy content, was substituted for the seconds of an earlier period. During this earlier period were developed also certain methods of preparation, made necessary by the limited variety of food products, which formed rational, balanced diets of almost scientific precision, such as the once famous, but now often spurned, corn pone and "pot liquor," the latter being little less than a concentrated essence of vitamins.

These changes in handling the preparation of food products with the consequent diminution of food values have taken place with such rapidity that the human economy has not had time to adjust itself to the change—for a century or two is a very short time in the development of a race—with the result that deficiency diseases have become exceedingly common, and malnutrition almost the rule rather than the exception.

It would appear, then, by the application of the knowledge we now posses we were about to enter a metabolic utopia; this is, however, very far from the case. However much has been learned during the recent past on this subject, it is exceedingly small in comparison with what yet must be learned before we reach this state. A total of three vitamins is now definitely known, with a probable fourth just discovered, and as yet each of these has been studied in relation to a single condition. Each of these may have an influence, probably all have, on metabolism in many other conditions, and it is almost certain that numerous other vitamins exist, concerning whose nature we as yet know nothing. The metabolism of certain of the earthy salts has been studied extensively, and the relation they bear to several abnormal conditions has been definitely determined, while the processes of digestion of the three cardinal food elements, fats, proteins and carbohydrates, have been understood for a number of years. Beyond these facts practically nothing is known.

It is entirely likely that those mysterious organs known as the ductless glands—or when grouped, form the so-called endocrine system, about which so much is written and so little known—play a role, perhaps an important one, in the process of metabolism. The activity of only one, the thyroid, has as yet been measured even partially; and yet it is supposed that one or more of these glands determine the size and shape of one or another of the body tissues, which means that they direct the ability of this or that tissue to assimilate or fail to assimilate, ingested food. It is supposed that each of these glands either stimulates or retards the activity of another of the group. Who knows but that some chemical combination of inorganic material or some unknown vitamin contained in the food we consume either activates or inactivates these glands, and so indirectly governs our growth and development?

The crowning achievement of scientific thought up to the present time is the biological cell doctrine, and to Gregor Mendel we owe the discovery of the fact that various characteristics which pass from generation to generation do so not by chance but by definite rule, in definite proportion and orderly sequence. This is now known as the Mendelian law. Through intelligent application of this law the control of plant and animal life has been made practical, and the development of desirable and suppression of undesirable qualities has reached the stage of scientific accuracy. Could we but control the mating of human stock the effect on the race would not be difficult to visualize.

The factors which determine stature, physique, muscular activity (hper- or hypo-kinetic), the color of the hair and eyes, the shape of the teeth and contour of the jaw and even the characteristics of temperament, through whatever organ or organs they act, are inherent in the cells and can be controlled only by in-breeding on the one hand and cross-breeding on the other. Yet the activity of these cells and their contained factors are obviously dependent on the soil in which they develop, the food which they assimilate. Therefore who can tell at the present time to what extent all of these matters are influenced, yes, even controlled by the quantity, quality and proportion of food products with which the growing organism is supplied?

In laboratory animals it may be shown that the offspring of a mother fed during pregnancy on food which is adequate for her maintenance, but deficient in a single element, or one marked by the total absence of one vitamin, are undersized at birth or of normal size at birth, yet reach adult life with stature stunted (the small size being out of proportion to a possible application of the law of filial regression), or do not live out the natural span of life. All of these characteristics are familial ones and therefore produced by heritable factors, and yet are unquestionably modified by an unbalanced diet. Which simply means that the cells containing these factors were so poorly nourished that they were incapable of functioning to the full extent of their inherent powers.

Similar experiments show that in animals born of properly fed mothers and themselves robust at birth, when food is supplied in sufficient quantities to meet the caloric needs of the growing organism and apparently perfectly balanced, with the exception of a single element, change in weight and stature takes place in a remarkably short time. If the lacking factor is supplied again within a certain time the animal soon regains its normal strength and development. If its administration is delayed beyond this time, however, regeneration does not take place. The application is too obvious for explanation.

It must be apparent that in whatever field we work, which bears directly on the development of human beings and the maintaining of virility after the period of development is past, knowledge of the science of nutrition is essential. The obstetrician must know what food to supply the expectant mother, so that at birth the offspring will be physically perfect. The physician must know what food is required by the nursing mother to supply the infant with a sufficient amount of fat, carbohydrate, protein, salts and vitamins. Likewise the dairyman must know what forage to supply the cow in order to produce the same quality of milk for the benefit of the artificially fed infant.

The dentist must know the food adapted to the production of teeth of good quality; to prevent deformities of the jaw from mechanical influences and to harden the jaw after correction of malocclusion, thereby preventing a recurrence.

The director of a school lunchroom must possess the same knowledge to adapt the lunches to the needs of the growing child. In fact, every one who deals with "man in the making" must possess this essential knowledge in order that definite ends may be attained.

It may be said that all this calls for such profound knowledge of an intricate scientific problem that it is out of the reach of the average person, but fortunately this is not the case. It is true that fundamental principles should be known, but only a small amount of actual knowledge is needed. What we call a balanced ration, i. e., one which contains a sufficient amount of the tissue-building, energy- and heat-producing elements, together with a liberal supply of the essential vitamins, is all that is needed to carry into practice the principles involved, and any one of a number of small and readable books can supply this. Man can live and thrive on milk, eggs, leafy vegetables and fruits, but of course these would become monotonous, and therefore a variety in food is desirable, but the essentials have been stated. We get what vitamins we need from common, everyday, simple food, and do not have to resort to proprietary preparations and yeast to supply them.

When we recall the fact that at the moment of conception our control of heritable characteristics ceases, that we then must deal with good and bad alike, and that with few exceptions we cannot tell in early life the desirable from the undesirable, but from the palace may go out a fool, and from the cabin may arise a genius, it must be clear, then, that all must be cared for alike and that our duty is to make the best possible citizen of the next generation out of the material as it presents in childhood. Since at present we cannot control the production of the cells making up the human organism, we must do the next most important thing—supply these cells with the best nutrition. Thus we become the moulders, in large measure, of the social fabric of the next generation, and the next; the makers of history through the better-nourished bodies of its citizens, doing our share in the advancement of civilization, and writing the romance of nutrition.

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ACUTE OSTEOMYELITIS.

The Differential Diagnosis and Treatment.*

By LOUIS A. McALPINE, M. D., Portsmouth, Va.

Of all the acute diseases there are few that are more serious, both from the standpoint of mortality and ultimate morbidity, than acute osteomyelitis. This is true because of the fact that unless an early diagnosis is made septicemia frequently develops or, if the victim of the disease escapes this, widespread necrosis of the bone occurs or secondary foci of osteomyelitis may occur in the other bones. The disease is also serious in that it is rare that the diagnosis is made early enough to institute the proper treatment in order to prevent the morbid changes in the structure of the bone.

In consideration of the seriousness of this infection and on account of the wide diversity of opinion as to what is the proper treatment at the proper time, I have prepared this paper, hoping to stimulate some discussion regarding the differential diagnosis and the treatment of the infection.

In order to consider carefully the diagnosis and treatment, it is necessary to mention the etiological factors concerned in the production of the disease. Acute osteomyelitis is hematogenous in origin, occurs most frequently in children, and is not uncommon in infancy. It follows the acute infectious diseases and is a frequent complication of typhoid fever. In the writer's experience, acutely infected tonsils have furnished the source of the infection in several cases. Local infections, such as otitis media, abscesses, carbuncles, pimples and the like, are sometimes responsible for the production of the disease. Exposure and trauma may be predisposing causes; however, the writer believes that trauma has very little bearing on the development of the disease, although most cases have some history of traumatism. This view is taken by reason of the fact that it is believed, if trauma were a predisposing cause, often we would have osteomyelitis with simple fractures. This, I believe, all will agree, is very rare.

The staphylococci, and principally the staphylococcus aureus, are the infectious agents most often met with, although the streptococcus is sometimes the invading germ. The

*Read before the Seaboard Medical Association at Newbern, N. C., December 1922.

histological anatomy of the bone marrow is unfortunately concerned to a great extent in the development of the disease. The extremely fine and "loop the loop" blood vessels furnish excellent places for the germs to lodge and the marrow itself furnishes rare culture media for them to flourish upon.

On account of the difficulty of early diagnosis and on account of the difference in the treatment of early and late cases, I prefer to discuss the symptomatology, differential diagnosis and treatment of first, the early cases, and second, the late cases. And when we speak of "early" and "late" in reference to acute osteomyelitis, we are speaking, as a rule, not in terms of days, but we are speaking in terms of a few hours, and we are dealing with an extremely ill patient. Let us qualify "early" as meaning the period from the time the infection of the marrow takes place to the time this infection spreads through the Haversian canals to the subperiosteal tissue; and "late" as the infection of the subperiosteal tissue or the formation of a subperiosteal abscess.

The pathological changes that take place within the cavity of the bone are rapid and extensive. The invading organism usually enters the bone at the epiphysis and inflammatory processes are at once inaugurated. There is vascular distention, associated with thrombosis of many of the vessels, leucocytic infiltration, coagulation necrosis, followed by liquefaction of the intercellular substance, and destruction of the tissue leading to purulent foci. Extension of these areas along the tract of the marrow leads to degeneration of the substance. This constitutes the pathology of the early case, or the first few hours of the disease.

Later, the infectious process spreads into the Haversian canals to the subperiosteal region. The blood vessels of the bone canals become thrombosed or blocked from pressure, and the circulation to the bone is destroyed. There is beginning bone necrosis and finally the formation of a subperiosteal abscess.

The differential diagnosis of the early case is frequently very difficult although the writer believes that, by careful study and painstaking examination, the correct diagnosis can be made in a greater number of cases.

Acute arthritis is the disease which is most often confused with acute osteomyelitis, and this is due to the fact that the infection of the bone commences at the epiphysis and the symptoms and signs are more or less referable to the joint. However, if the following points are borne in mind, this differentiation will become more apparent. In osteomyelitis, the source of the infection can usually be determined. The disease comes on suddenly with immediate pain in the affected part, pressure or percussion reveals an area of marked tenderness at some point in the bone, and not the joint; the examiner by easy manipulation can move the joint without giving the patient pain. In addition there is high fever, and very severe constitutional symptoms, with a pronounced leucocytosis. In acute arthritis the swelling of the joint coincides with the appearance of the pain and the joint cannot be moved without great pain to the patient. The disease is likely to be polyarticular. The leucocytosis is insignificant and the constitutional symtoms very much less severe.

The early, very serious case of osteomyelitis that immediately overcomes the patient, producing stupor or delirium, is sometimes confused with other infections such as typhoid fever, meningitis or septicemia. These, however, are diagnosed by blood culture or spinal puncture, providing of course, the patient survives long enough for this to be done. In these cases of general infection, Lexer has pointed out that it cannot be decided whether the general infection has developed from the bone suppuration or whether the latter is only an incidental localization of the severe general infection.

Scurvy produces a painful and very tender swelling in the shaft of the bone with mild constitutional symptoms, such as pallor and slight fever, but the severe toxic symptoms are totally lacking.

The late cases of acute osteomyelitis give a much clearer clinical picture. The subperiosteal abscess has usually ruptured through the periosteum and there is extension into the soft tissues, giving all the signs of a very acute inflammatory process. The differential diagnosis in this case is the same as in the early case, with the exception that the examiner has the added advantage of the extensive local signs such as swelling, redness, tenderness and heat.

In the diagnosis of acute osteomyelitis, it must be remembered that X-ray examination is always negative for at least the first ten

days of the disease and must not be considered a factor in the diagnosis.

Treatment

The first thought in the treatment of acute osteomyelitis should be that it is an emergency condition and should be dealt with by immediate surgical procedures as soon as the diagnosis is made and, even in those suspicious cases where the diagnosis is not entirely clear, an exploratory operation is not amiss.

Poultices and plasters have no place in the treatment of a suspected infection of a bone and such temporizing measures cannot be too strongly condemned.

Review of the literature brings us face to face with conflicting opinions regarding the extent of operative work to be done in the acute cases. Many authorities advise simple incision over the point of greatest tenderness, and trephining two or three openings in the bone, while others advise the troughing of the shaft for the entire extent of the infection.

Halle even goes so far as to advise only incision of the soft parts and division of the periosteum with drainage, and quotes statistics to show that in 304 acute cases there was a mortality of 16.66% in 144 cases in which the bone was opened, and 7.59% in 79 cases in which there was simple drainage of the soft parts. He believes there is ample drainage through the Haversian canals. Of course he concedes that a secondary operation is always necessary. While bearing these opinions and statistics in mind, it is the humble opinion of the writer that the method of treatment to be employed in a given case should be determined by the extent of the pathology present and not by set rule to cover all cases. Thus, in the early case, that is before the infection has spread through the Haversian canals, a small opening through the cortex of the bone, into the marrow cavity, and drainage will frequently suffice to cure the acute process and make secondary operation unnecessary. Also in the late case, that is, after the infection of the Haversian canals and subperiosteal tissue, it is necessary to open widely the marrow cavity and to remove the spongy infected bone, and drain thoroughly. Frequently this procedure will cure the acute case and sequestration will not take place.

The early case should be drained with either a gauze wick or tube but should not be packed. The late case should be either packed with gauze saturated in dichloramin-T or Dakinized. There is not much choice between the use of dichloramin-T, packing and the Carrel-Dakin treatment, as far as final results are concerned. There might be a slight advantage in Dakininzing in that there is not the pain and discomfort of frequently removing packing from the wound.

In reference to the use of dichloramin-T, the writer has observed that frequently the solution used is put up in a clear glass bottle and the specimen has undergone chemical reaction on exposure to light, causing a change in color and a precipitation. Any solution of dichloramin-T that has a red clay color and a precipitate in the bottle has either been exposed to light, or improperly prepared and is absolutely useless. A 5% solution of dichloramin-T in chlorocasane oil has about the same color and consistency as castor oil.

In the operation on either the early or the late case, no curretting of the marrow cavity should be done, as this destroys the osteogenetic cells and delays regeneration of bone. A very important point in the treatment of any case is that the primary focus of the infection should be removed, is possible.

Conclusions

1. Acute osteomyelitis is a serious disease, occurring generally in childhood, and frequently causes death or permanently disables the victim.

2. The disease may be divided into "early" and "late" cases according to the extent of the pathological processes taking place in the bone. The "early" cases are those in which the inflammatory reaction is confined to the marrow cavity and the "late" are those in which the inflammation has spread through the Haversian system to the subperiosteal tissue.

3. The differential diagnosis of the "early" case is sometimes difficult but can be made more often by painstaking examination and a critical analysis of the sypmtoms and signs of the disease. The "late" case presents a more definite symptom complex and the diagnosis is more readily made.

4. The treatment of "early" cases consists of opening the medullary cavity and drainage of the infected area by means of gauze or a tube. The "late" case is treated by means of widely opening the medulla, removing the infected bone, and packing with gauze satur-

ated in dichloramin-T, or by Dakinizing. These methods frequently will cure the acute osteomyelitis and sequestration will not take place.

SOME ESSENTIALS IN FRACTURE WORK.*

By GEORGE H. REESE, M. D., Petersburg, Va.

As indicated by the title of this paper it is limited in scope to general prinicples, being a crystallization of my observation and experience derived from four years of industrial surgery at Hopewell, and at Old Hickory Works, near Nashville, Tennessee. At the end of this period I had the satisfaction of emerging without a lawsuit to my discredit, or a broken bone treated of which I had reason to be ashamed. The factors contributing to this measure of success I shall endeavor to set forth, as space permits, for the consideration of others engaged in the same kind of work, with no more training or experience than I had when I assumed this obligation.

It is self evident that the first important requisite in the treatment of fracture is that the surgeon should have an accurate mental picture of the condition with whcih he has to deal, He must have a sound knowledge of anatomy, physiology, and pathology; for it is upon these essentials that all diagnostic measures are reared. He must have mechanical skill. Without these three fundamentals no one can ever hope to treat fractures successfully.

With this equipment assumed, we may ask, what are the diagnostic points in fractures? and answer: preternatural mobility with bony crepitus, and X-ray confirmation. Deformity, ecchymosis, and persistent pain are highly suggestive, and I would urge for them, careful consideration; but they may attend other traumatism or be the result of an old disease or injury, or be the simulation of a skilful malingerer. All the other symptoms and signs of fracture unaccompanied by the above may, for all practical diagnostic purposes, be forgotten.

All cases of traumatism should be X-rayed. Do not confine the X-ray to known fractures or suspicious cases, otherwise fully 10% of fractures will go undiagnosed as such. Have them X-rayed in two or more positions. One picture is useless as a rule, for either scientific diagnosis or treatment. The information gained by the surgeon who has cases thoroughly X-rayed is amazing to himself and of untold value to his patient. He finds a fracture where he could hardly notice a contusion. He finds a known or suspected fracture associated with another fracture, or an unsuspected dislocation. He may have a slight or serious laceration, which is really a compound fracture, and fail to treat it as such without X-ray confirmation. He may have an impacted fracture which it would be unwise to disturb; or a transverse fracture without displacement, to say nothing of other fractures, which might result in confusion to himself and disaster to his patient should manipulative attempts be made under ether or otherwise, to elicit the pathognomonic signs of fracture. Comminuted fractures, linear fractures, impacted and all other fractures, are revealed by the X-ray and differentiated as by no other method.

Should open operative treatment be in mind, its character will be determined by radiographic findings, or the necessity or the advisability of this form of treatment indicated. The advantages to both patient and surgeon of thorough radiography, before the injury is further manipulated, are so many and so vital, that it is amazing to find in most books the statement, that if only one X-ray picture can be had, it should be taken after the fracture has been set. This is a negation of the value of accurate diagnosis, without which there can be no assurance of proper treatment; it is utterly selfish and to our way of thinking the most pernicious idea ever advanced about a condition, where diagnosis often means everything.

When a fracture is encountered it should be treated with the utmost gentleness and the least possible movement of the bones permitted before the final dressing is ready to be applied. If in great pain or shock the patient should be given morphine at once, and the limb gently straightened and splinted before transportation is undertaken. No attempt should be made at reduction until everything is ready for the permanent dressing, unless the fragments are threatening to erupt, or are impinging upon blood vessels, nerves or other important structures.

All fractures should be set as soon as possible. Delay is often convenient for the surgeon, but

*Read at a meeting of the Southside Virginia Medical Association in Petersburg, March 1923.

inevitably adds to the distress of the patient and to an increase in his pathology. In severe shock, in fractures associated with burns, severe abrasion or lacerations, often this rule has to be evaded. A complicating hematoma may be aspirated under aseptic conditions, a compressive dressing applied, and fixation proceeded with as usual.

In all compound fractures great care should be taken not to add to the existing infection. Consequently it is of the greatest importance not to let the exposed bone ends retract until they and the surrounding wound have been thoroughly disinfected. This should be done with full strength iodine and an aseptic dressing applied before the patient is moved. If this is impossible, he should be hurried to the operating room as gently as possible, the wound thoroughly scrubbed clean of all foreign matter with guaze sponges saturated with iodine; bone fragments, etc., removed with sterile instruments, and proper drainage provided. If necessary, enlarge the wound to any extent demanded for thorough inspection and removal of all suspicious material.

I mentioned iodine as the initial disinfecting agent because it is time honored, efficient, and almost universally available. Other disinfectants may be used and some of them are doubtlessly as good as iodine.

As a secondary disinfectant of compound fractures, nothing has a superior record to Dakin's solution. Other chlorine compounds are highly efficient. We found them more troublesome to obtain, keep fresh, and to administer, however, than our old routine of iodine followed by apinol. This latter made its own way with us as a highly efficient, unirritating antiseptic. It is efficient as a cleansing or antiseptic agent, either alone or combined with 10% tr. of iodine. For the treatment of lacerated wounds, it gave us most excellent results.

The above remarks presuppose a rigidly aseptic technique. Under no circumstances should any unsterile object he brought into contact with a compound fracture. Only in unavoidable conditions should even the gloved finger be introduced into the wound. Cleaning the injury with sterile instruments, gauze and antiseptics, should be accomplished without any unnecessary digital invasions. To ignore this rule is to invite trouble.

In setting a fracture of consequence, general anaesthesia is usually indispensable. This should be insisted upon by the surgeon and the blame for its omission placed squarely upon the patient. Exact approximation of the fragments is the ideal to be attained, and the surgeon is entitled to every aid in his effort to secure a perfect anatomical and functional result. This attainment is impossible when combated by spastic muscles and a resisting patient. It is not always easy to secure accurate reduction even by open operation under general anaesthesia; hence the folly of attempting the reduction of any major fracture without deep narcosis.

Most fractures are best set under the fluoroscope. If this is impossible, set them as usual and check by radiograph before completing the operation. If unsuccessful in the first attempt, repeat the performance as often as necessary in order to secure a good result. If such cannot be approximated after repeated trials, open operation may be justified, provided surrounding conditions are such as to warrant so radical a procedure.

The conversion of a simple fracture into a compound fracture is a step to be taken only as the last resort. This is rarely necessary in the fractures of long bones but, strange to say, this is where most of it is done, and where most of the wiring and plating is perpetrated.

There are some fractures that demand open operation for successful reduction; for example some fractures of the jaw, some fractures of the patella, olecranon, and some fractures with dislocation. When such lesions are encountered, they should be operated upon at once and the fragments neatly approximated. If any internal fixation is necessary, it should be accomplished by an autogenous bone graft, bone peg, chromic gut, or kangaroo tendon. If wire or plates are ever used, they should be inserted with the understanding that they are to be removed as soon as the bone has united. When left, they almost invariably give trouble. This should be borne in mind whenever any unabsorbable material is used.

There is scarcely any justification in modern surgery for the use of wire in fractures, and but little more justification for the use of plates. Used surgically, they are intended merely to approximate the fractured bone ends, not to splint them. The splinting has to be done by other methods; hence the need of wire and plates for purposes of approximation vanishes.

In the application of external dressings, everything depends upon the skill and ingenuity of the operator and scarcely less upon well trained assistants. Every surgeon has to adapt himself and methods to meet the variations of each individual case. He cannot do his best unassisted and should not from a medico-legal standpoint undertake to set a major fracture alone.

The immediate complications of fracture, such as injury to the brain, bladder, nerves, and bloodvessels, of course, require added attention to each specific need.

The late complications, such as necrosis, ulceration, gangrene, paralysis of nerves, and excessive atrophy and paralysis of muscles, are usually due to faulty methods of fixation or to improper or neglected after treatment.

After treatment is a factor of prime importance in the successful management of fractures. The splints should frequently be removed, the skin inspected for trophic disturbances, the parts bathed with alcohol, and gentle massage and passive motion instituted. Stiffness of joints can be eliminated almost entirely by early passive motion. This should be commenced within a week or ten days of the injury, under gas if necessary, and be gently and gradually increased, until full movement is attained. Suppurative wounds of the joints were found by the war surgeons to be highly benefited by this simple procedure. By persistent effort, the joints in simple fracture should be normal in motion, or nearly so, by the time the bone has solidly united. This means a great deal to the manual laborer.

In the old and the debilitated, in those contused about the thorax, ether, as an anaesthetic, should be avoided, if possible. Gas oxygen or chloroform should be used instead. These patients are prone to develop hypostatic or traumatic pneumonia and nothing should be done to increase this tendency.

In splinting the fracture, leave the patient mobile, support him by appropriate constitutional measures and circulatory stimulants, elevate his body, if feasible, and as soon as possible get him up and about on ambulatory splints. Treating the patient in the aged is of far more importance than treating the injury. The syphilitic may require anti-syphilitic treatment, while the alcoholic may spring delirium tremens, or traumatic insanity develop in any severe case, necessitating control before successful union is secured.

Success in fracture work is won by the taking of infinite pains. This paper is a plea to the general surgeon and practitioner to bestow a greater skill, consideration and effort, upon this neglected branch of surgery than has been given in the past.

Many surgeons, for reasons best known to themselves, are disinclined to engage in traumatic surgery. Some have referred to their war experience as blunting their technique and tending to unfit them temporarily for work in private life. In this connection it may be well to note the one great surgical achievement of the war. Dr. Alexis Carrel, already a surgeon of world-wide fame, being dissatisfied with his own technique and that of the French and British surgeons, set about to discover a better method of treating infected wounds. As a result of his labors, hundreds of lives have been saved, and thousands of limbs are sound and well that otherwise would have been lost.

X-RAY IN THE TREATMENT OF CANCER.*

By DANIEL D. TALLEY, JR., M. D., Richmond, Va.

In this paper some attempt will be made to outline the problems attendant upon the employment of the rays in malignant disease, to comment upon the measure in which these problems have been overcome and to discuss briefly the relations of the rays to the other principal methods now used in treating cancer; not so much with an idea of establishing the superiority of any one method or agent, but with regard to the co-operative use of all.

That both the X-rays and the rays of radium have the power of causing destruction of cancer cells within the living body, if applied to the involved area with sufficient intensity, has been well established and is universally admitted. The desiderata therefore have been (1) the constant production of rays powerful enough to produce desired effects in the deepest tissues of the body, (2) the accurate measurement of such applications, (3) the complete destruction of the irradiated pathological condition without doing injury to the skin and healthy tissues around or above the growth, and (4) the avoidance of harmful constitutional effects or alarming symptoms which

*Read in the Symposium on Cancer at the meeting of the Tri-State Medical Association at High Point, N. C., February 22-23, 1923.

may follow the use of the more penetrating rays in large quantity, over areas of considerable size.

The advent of the Coolidge tube approximately one decade ago was a great step in the advance of Roentgen ray therapy, in that it made possible the constant production of rays of deeper penetration than could be produced previously for practical purposes. This widened the field of this therapy, since it enabled us to influence malignant cells in the deeper tissues to an extent hitherto impossible. Less than five years ago the German roentgenologists began to employ apparatus capable of delivering rays of a far greater penetrating power than anything previously produced and with these rays of powerful penetration still more satisfactory results began to be reported. The use of this method of technique, at least to any considerable extent, has in this country been limited to a period of less than two years, but apparatus for its employment is coming into more and more general use.

As many readers may be unfamiliar with certain principles in the production, employment and effects of the X-rays, it is believed that a few words of explanation here may be helpful: (1) The rays produced from any X-ray tube are heterogeneous. That is, no matter how high the penetration of some of the rays may be, there will also be produced at the same time rays of lower penetration which would naturally be absorbed by the skin and superficial tissues and thus damage same in attempting to produce deep effects. In order to obviate this damage, filters are interposed in the path of the rays which allow only the more penetrating ones to pass through and thus reduce skin absorption to a minimum. Aluminum and copper are the most common filter materials now in use. (2) The rays of higher penetrative power are of relatively short wave length and are produced by currents of much higher voltage than are those of lower penetration. (3) From the primary X-rays entering the tissues, so called secondary rays are produced in the tissues themselves, to which a considerable proportion of the destructive effect is due, though the primary rays also contribute to the result. (4) The intensity of the rays varies inversely as the square of the distance of the tube focus from the area treated. This law is responsible for the fact that the further away the tube is from the body surface the more nearly equal will be the intensity of the rays in all the tissues irradiated. (5) If a deep lesion be irradiated from several different directions or through several so-called "ports of entry," a maximum effect may be produced in the lesion with a minimum skin damage, as a different skin surface is exposed each time.

Experience has shown that the ideal way to treat malignancy with radiation is to destroy it as quickly as possible by attacking boldly, and if possible, administering a lethal dose to every part of the growth at one sitting, or in a few treatments given over a very short period of time. The reason for this is that incompletely irradiated growths tend to acquire increased resistance to repeated radiation, and it has been claimed that a very small dose will stimulate instead of destroy.

The application of this principle may require many hours of treatment at one time or spread over a few days and has brought several new problems for solution. One of its results is the more or less profound condition of radiotoxemia characterized by nausea and vomiting, diarrhea and extreme weakness and possible rise of temperature. These symptoms may be especially profound after extensive abdominal radiation. Symptoms usually last only a few days but may be prolonged, and large doses or overdoses have even led to occasional fatalities. As the blood stream passes beneath the irradiated areas, its cellular constituents receive the effect of the radiation and certain changes take place which may require weeks or even months to become restored to normal. Other changes may take place in normal organs and tissues. These facts render the administration of intensive deep roentgen therapy a procedure requiring careful and intelligent consideration and study, and make it increasingly dangerous if the general vital forces are not up to normal. It is contraindicated if cachexia has begun.

Another problem is the question of dosage. For instance, not only does carcinoma require a different dose for its destruction from sarcoma, but one type of either of these tumors may respond to a dose which would not destroy another type. Furthermore, it has been pointed out that the kind of normal tissue in which a tumor grows may have a marked bearing upon the radiation susceptibility. In treating malignant growths which involve deep

tissues, it is ideal to give a radiation dose which will be just sufficient to destroy all the pathological cells without producing damage in the surrounding or overlying healthy tissues, it being a well established fact that cancer cells are less resistant to the rays than normal tissue cells. Irreparable injury may be produced if the dosage is sufficient to destroy normal structures. As a result of extensive experimentation and study, both on the part of the physicists and the clinical workers, the question of accurate measurement of dosage in the deeper parts of the body is being worked out, this problem being by no means a simple one. It is further complicated by the fact that the power to diagnose the entire extent of the malignant growth is limited, especially in the more deep seated lesions.

The problems of ray therapy have likewise been taken up by the pathologist and biologist notably with regard to the tissue changes produced by irradiation and the reaction of the normal tissues, which may be an important factor.

The foregoing remarks are intended to show that careful study and special medical knowledge are required to employ the roentgen ray proficiently and that much concerning its effects and methods of administration has yet to be learned. The remainder of my remarks will tend further to bear out these facts.

The two most efficient methods in the treatment of malignant disease today are surgery and radiation, or radiotherapy. Radiotherapy includes the use of both the X-rays and radium. The effect of these two agents upon cancer cells is practically identical and they should be considered rather as adjuncts to one another than as rival forces. Without going into physics, it may be said that X-rays may be produced in far larger quantities than radium rays and are thus more useful for application to large and deep areas. Radium may be introduced into cavities or in various forms may be buried in the pathological tissues, and when so used in more or less close contact with the area diseased may be more efficient than the X-ray. Its destructive power is limited, in the amounts available for use today, to a distance of a few centimeters into the tissues. The advantages of the X-ray, therefore, are in external radiation, those of radium where the salt or the emanation may be brought into contact with the malignant tissue. It will thus be seen that there are many types of malignancy where the X-ray and radium can be used to the best advantage in conjunction with one another. Certain of the gamma rays of radium are of shorter wave length than any known and are more efficient in their effects on malignancy. In order to compete externally with the X-rays as now produced, however, huge amounts of radium would be required at a prohibitive cost. Schmitz believes the ideal would be to produce with the X-ray the effect of the gamma ray of radium. As the apparatus is at present constructed, the X-rays produced are not of short enough wave length to do this but the opinion is held by some that for practical purposes they are efficient.

What relation does radiotherapy bear to surgery? Surgery in malignant disease may in a sense be regarded as a finished product, in that as far as we can now see, no new methods of technique are likely to influence cancer mortality to any great extent. That the practitioners of surgery themselves are far from satisfied with the results of their art as applied to cancer is well known to anyone at all familiar with operative statistics of this disease.

The conscientious surgeon, therefore, should welcome and does welcome any agent whereby the cancer mortality may be reduced for use (1) in cases where the results from its employment may be superior to those obtained by operation, (2) in cases where a combination of methods may promise a cure, unobtainable by either method alone, and (3) in cases where surgery cannot be employed with any reasonable hope of success. Reliable opinions seem to justify the belief that radiotherapy comes nearer to filling this need than any other known agent.

No argument will be here set forth to advance claims for radiotherapy in those cases which are really operable; that is, where there is reasonable assurance that the whole of the cancer tissue may be removed without recurrence or metastasis. There are exceptions to this rule, as for example in most cutaneous cancers, where X-rays or radium occupy an established position, and in the first stage of cancer of the cervix uteri where statistics of five year results show that even at the present day radium alone or in conjunction with intensive X-ray therapy can compare favora-

bly with surgery, so that some surgeons prefer the former method. In those cases of malignant disease which are on the borderline of operability, it is fairly well established that more satisfactory results have been obtained by surgery when either preoperative or postoperative radiations, or both, are used. The instances in which apparent arrest of the disease has been secured in inoperable cases by radiation alone are many; its use in the treatment of local recurrences after operation is gratifying; and the palliative and occasionally permanent results after deep metastases are worthy of note.

Of the high voltage X-rays of short wave length and deep penetration above referred to, it may be said that the results reported by foreign observers have been generally received in this country with a commendable conservation. It has been believed that some of these reports have been much tainted with overenthusiasm and they have been correspondingly discounted. Furthermore, sufficient time has not elapsed since the inception of the newly modified form of therapy to speak of what the real and final results from its use may be and many problems of its administration yet remain to be solved. It may be admitted that the dangers do not seem to be contraindicative to its use in competent hands, and that many of its problems seem possible of solution, but the time is not yet ripe for positive statements.

Giving the foreign reports a reasonable amount of credence, however, and judging from the statements which come from those who have had any considerable experience with the use of such rays in America, it would seem that the results are superior to any obtained previously, and that the outlook is favorable for still more gratifying achievements.

That any achievements from radiotherapy will be enhanced by earnest co-operation between surgeon and radiologist in selecting cases for treatment, in planning this treatment, and in carrying it through is believed to be obvious and unnecessary of further comment.

104 *Professional Building.*

THE "CATTLE-TRUCK" SYMPTOM.

By COURTNEY EDMOND, M. D., F. A. C. S.,
Clifton Forge, Va.

Mrs. "B.", naturally much agitated, 'phoned that a spot had suddenly come before her right eye and that it would not go away, asking what should be done. The reply was that she should first come to the office, allow the trouble to be determined and then be advised as to treatment. She came within about thirty minutes, stating that the spot was enlarging, the vision worse, and that she could see but imperfectly in an upward direction only. Suspecting closure of the retinal artery, the following brief history was quickly obtained:

Age 26, healthy, married, two children. On other occasions for many years, at long intervals, the same kind of spot had appeared before the right eye, only to promptly disappear with slight annoyance. The present attack was different because of the greater visual disturbance and the longer duration.

Macroscopically: The affected eye presented a pupil a trifle larger than its fellow, reacting to light somewhat sluggishly. Intraocular pressure unchanged to palpation. Vision greatly reduced centrally with a kind of ebb-and-flow of peripheral vision.

Ophthalmoscopically: Right pupil noticeably larger; fundus-reflex whiter than normal; ocular media clear; papilla pale; retina ischemic, particularly about the macula where the smaller vessels stood out more clearly than usual; no hemorrhages; no visible embolus. The macula was a red spot in marked contrast with its paler environment, the "cherry-red-spot." The classical symptoms of occlusion of the central artery were well developed. The retinal vessels were but slightly narrowed, with the following striking picture in the upper temporal artery and vein: The blood-stream in these two vessels was broken up into hundreds of minute moving segments, or cylinders, of blood-cells with intervening clear spaces of plasma; a kind of slowly moving procession of beads of blood, which has been designated the "cattle-truck" appearance.

This procession of cylinders represented a diminished blood-stream and all were moving at about the same rate of flow, without jerking or hesitation, outward in artery and inward in vein, or according to the natural current. Where the vein crossed over artery, with a distinct bend in the former, the little cylinders could be observed to hurry, or "speed-up," as if wishing not to be seen while coursing the bend of the vessel. It appeared as if gravity might be having special effect at this point.

At the papilla the cylinders piled end-on-end, forming a continuous blood-stream but without visibly elongating the stream during the interval of observation. The motion described was not the result of digital pressure except that the patient stated she had been rubbing the eye rather frantically in efforts to dissipate the cloud. In fact, I could not determine at the time of the office visit that such pressure had any appreciable effect upon the moving cylinders. The following morning there was no "cattle-truck" symptom.

This simile, no doubt, is of English origin, as I am informed that the American cattle-car, or its equivalent, in England, is called "cattle-truck." While a bit fanciful, a train, or procession, of reddish cattle-cars reduced to ophthalmic proportions might prove a close resemblance to the remarkable picture referred to, the writer shall lay no claim to the discovery of the analogy.

There is, perhaps, little to justify this report. It may but enroll another upon the list of those who have observed this well known phenomenon which is diagnostic of arterial occlusion. Attention, however, might be directed to the history of previous transient obscurations of vision in the right eye, when, no doubt, the lumen of the artery was threatened; the excellent physical condition of the patient, without heart-lesion or other apparent source of embolus, and the reduced blood-stream as seen with the ophthalmoscope. These would appear to be points against embolism and in favor of an endarteritis or thrombotic process. Not all are in harmony with an eminent authority who surmises that emboli may circulate normally, or in those but slightly ill, lodging often where no notice can be had of their situation, the patient, of course, being unable to escape attention to an embolus affecting vision.

In the several cases of so-called embolism occurring in my practice, none before has given history of prodromal attacks of fleeting blindness, although I am aware that such history is not unusual. It was my first opportunity to observe the "cattle-truck" symptom, and I could but meditate upon what a perfect, vivid demonstration was afforded of the circulation of the blood and the differing directions of arterial and venous flow. It was an ophthalmoscopic entertainment and the one good "movie" I have seen.

Analyses, Selections, Etc.

The Pathogenesis of Subacute Combined Degeneration of the Spinal Cord, with Special Reference to its Connection with Addison's (Pernicious) Anaemia, Achlorhydria and Intestinal Infection.

The authors point out that, in the past, the nervous system in this combination has been studied chiefly by neurologists little interested in the anaemia; or by physicians whose attention was focused on the anaemia largely to the exclusion of the neurological aspect of the subject. They refer to the increasing frequency with which spinal cord symptoms are recognized in Addison's anaemia as they have become more systematically looked for, the later reports placing the figure at approximately 80 per cent. On the other hand, they note an increasing tendency toward recognition of the anaemia associated with this lesion of the cord as belonging to the Addison type of anaemia. They so regard the blood picture in the eight cases of the degenerative cord condition reported by themselves.

Having thus related these two syndromes to each other, they consider achlorhydria as a link in the chain of pathogenesis. Achlorhydria is the most frequent of all the ear-marks of Addison's anaemia, not excepting the classical blood picture, occurring in about 96 per cent of cases. Furthermore, they consider it firmly established as a condition precedent to the blood changes. Likewise they found an achlorhydria persisting throughout digestion in each of their eight cases of subacute combined cord degeneration; whereas its frequency in other conditions is shown in the table given on next page.

In three cases suggestive of subacute combined degeneration, but with a normal gastric acidity curve, the diagnosis eventually proved to be syphilis of the spinal cord.

The authors' ideas as to pathogenesis are clearly stated. They believe that Addison's anaemia only develops in individuals who have achlorhydria. The anaemia is caused by haemolytic toxin absorbed from the intestine, where it has been produced by the action of bacteria coming originally from the mouth, the presence of achlorhydria having deprived the stomach of its antiseptic powers, which normally exert a powerful influence in protect-

TABLE III. RELATIVE FREQUENCY OF ACHLORHYDRIA IN VARIOUS CONDITIONS.

	Number cases	Achlorhydria Number	Achlorhydria Percentage	Low acidity	"Normal" acidity	High acidity
Normal (Bennett and Ryle)	100	4	4	1	87	8
Various medical diseases (Bell)	425	63	14.8	53*	205†	104‡
Addison's (pernicious) anaemia	66	64	96	1	1	0
Carcinoma of stomach	10	3	33	3	3	0
Subacute combined degeneration of cord	8	8	100	0	0	0
Tabes dorsalis	9	1	11	1	5	2
Disseminated sclerosis	8	0	0	1	7	0

*12.5 per cent.
†48.3 per cent.
‡24.4 per cent.

ing the bowel from such infection. In addition to the haemolytic toxin, there is a neurotoxin. Although one or the other may appear to be present alone in the early stages, it is rare for the haemolytic toxin, and still more rare for the neuro-toxin, to continue to be produced without the other throughout the course of the illness.

Naturally, in treatment, these authors emphasize the most painstaking and complete eradication of dental, tonsillar, and sinus infection; the administration of dilute hydrochloric acid in sufficient dosage, usually 1½ drachms in 4 oz. of water, preferably with lemon juice and sugar. The acid is to be sipped during and for half an hour after the meal, and continued during life.

Active lactic acid milk, and a vaccine from any streptococcus obtainable from the mouth, duodenum, faeces or urine, are also recommended. Transfusions when indicated, and arsenic, with due care lest an arsenical neuritis be obscured by existing cord lesions, are of value. Little can be expected in the matter of cord symptoms beyond arrest of their progress, though some improvement may be obtained by systematic exercises. (*A. F. Hurst, M. D. Oxon and J. R. Bell, M. D., Melb.: Brain, XLV., Part II, page* 268).

J. H. S.

Proceedings of Societies

The Augusta County Medical Association

Held its annual meeting and members were entertained at the home of the retiring presiden, Dr. J. B. Stone, of Churchville, Va., August 1. There was an attendance of about 30 members and visitors and 25 ladies. Dr. John Wilkins Brodnax, of the Medical College of Virginia, delivered an address on "Art as Applied to Medicine," which was illustrated by lantern slides. Dr. J. C. Flippin, of the University of Virginia, the other invited guest, was prevented by death in his family from attending. A paper was also read by Dr. Kenneth Bradford, of Staunton, on "Infectious Diarrhea in Children." The treasurer, Dr. J. F. Fulton, of Staunton, reported a balance of $100 in the treasury.

Officers elected for the coming year are: President, Dr. Alex. F. Robertson, Staunton; vice-presidents, Drs. F. E. Hamlin, Staunton, Thornton Hankins, Fordwick, Harry White, Fishersville; secretary, Dr. H. G. Middlekauff, Weyers Cave; treasurer, Dr. J. L. Alexander, Staunton, new member of board of censors, Dr. R. S. Griffith, Basic.

A Delegate's Notes from the National Women's Medical Auxiliary.

The American Medical Association at the Convention in St. Louis in 1922 adopted a resolution presented by the Texas delegation that a Woman's Auxiliary should be formed in each state. A temporary organization was formed by the women who attended that meeting, and a permanent organization was effected at the recent San Francisco Convention.

Mrs. Red, of Texas, the president, called an informal meeting on Tuesday morning, June 26, to discuss the constitution and policies of the Auxiliary, about twenty ladies being present. The first regular business meeting took place at the beautiful Fairmont Hotel, Thursday morning, June 28, with a large number of ladies in attendance, representing many states. Mrs. Red gave all a most cordial welcome, and presided with grace and dignity, and explained the object of the meeting. Her report of the work that had been accomplished during the past year, especially that of the Texas Auxiliary, which was organized five years ago at the suggestion of Mrs. McReynolds, was most interesting and inspiring. There were four past

state presidents, and three recording secretaries from Texas present.

Dr. Southgate Leigh, of Norfolk, Dr. Seale Harris, of Birmingham, and Dr. McReynolds, of Texas, all spoke briefly on what the Auxiliary could do to help the medical profession, such as getting better sanitation in the schools and in the homes of the poorer classes, and creating a sentiment against the various fads, fakes, and cults, that are sweeping over the country and deceiving so many of the uneducated.

After the addresses, Mrs. Red stated that fourteen states were represented at this meeting, that ten were already organized, and that much interest was being manifested in this pioneer work to aid the physicians. Mrs. Red told of her visit to Birmingham, where she, with the able assistance of Mrs. Seale Harris, had organized a very enthusiastic auxiliary, and at the invitation of Dr. Long, the president of the North Carolina Society, she attended the State convention last May in Asheville, and organized its auxiliary, Dr. Long giving many valuable suggestions, and this movement now has the enthusiastic co-operation of the women of that state.

The business session was followed by the election of officers, which are: Mrs. S. C. Red, of Houston, Texas, president; Mrs. J. Allison Hodges, of Richmond, Va., president-elect; Mrs. Southgate Leigh, of Norfolk, Va., Mrs. Robert E. Farr, of Minneapolis, Mrs. Seale Harris, of Birmingham, and Mrs. F. P. Gegenback, of Denver, vice-presidents; Mrs. W. A. Wood, of Waco, Texas, recording secretary; Mrs. H. L. D. Kirkham, of Houston, Texas, corresponding secretary: Mrs. A. E. Baker, of Charleston, S. C., treasurer; and Mrs. Harris Smith, of Delta, Colo., parliamentarian.

Each of the four vice-presidents was assigned twelve states to organize during the next year.

As previously reported in these columns, Virginia was organized last Fall at the meeting of the State Society in Norfolk, with Mrs. R. Lloyd Williams, of Norfolk, as president, and since then several auxiliaries have been formed in different sections of the State. The Virginia Auxiliary was represented at the Convention in San Francisco by two delegates, Mrs. J. Shelton Horsley and Mrs. J. Allison Hodges, of Richmond, and Mrs. Southgate Leigh, from Norfolk, as the first vice-president on the National Board.

It is regretted that more members could not have attended this meeting to gain inspiration for the work, and to have enjoyed the lavish hospitality extended by the ladies of San Francisco. California and the Golden Gate looked most beautiful that brilliant June day when the delegates arrived after their long trip, and the West more than ever sustained its reputation for "receiving strangers with open arms," for not only were the visitors handsomely entertained in the Convention City of San Francisco, but in several cities en route, and the doctors in Albuquerque, Los Angeles, and Portland, provided motor trips and delightful hospitality for the few hours the delegates stopped when passing through these cities.

The Convention, as an event, is over, but as a golden memory and inspiration, it will linger all through life.

M. G. H.

The Medical Women's National Association

Held its ninth annual meeting in San Francisco, June 25 and 26, in conjunction with the American Medical Association meetings. Dr. Grace N. Kimball, President; Dr. Kate Campbell Mead, President-Elect. At the open session, Monday evening, Dr. Ray Lyman Wilbur, President-Elect of the A. M. A., delivered an eloquent and inspiring address on "The Power of the Minority."

At the open session, Tuesday morning, a Five Year Program was presented by the Executive Committee and Council, and was adopted. This Program is under Five Heads:

1. Continuation of the Work of the Committee on Medical Service, American Women's Hospitals; Dr. Esther P. Lovejoy, Chairman, 637 Madison Ave., New York.

2. Federation of American Women's Organizations with the Medical Women's National Association, under Organization Committee; Gertrude A. Walker, Chairman, Whitefield, N. H.

3. Public Health, Co-operating with A. M. A. Council on Health and Public Instruction, Hygiene, and Women's Foundation for Health, etc., Dr. Elizabeth B. Thelberg, Chairman, Vassar College, Poughkeepsie, N. Y.

4. Committee for Medical Opportunities for Women, Dr. Sue Radcliff, Chairman, 21 Morris St., Yonkers, N. Y. Internships for Young

Graduate-Members of the M. W. N. A. in Hospitals Conducted by the American Woman's Hospitals; in Missionary Hospitals and in Hospitals in U. S. A., as well as Opportunities for private practice, Service on Boards of Health, Government Appointments, etc.

5. Publicity for the Medical Women's National Association through the Bulletin and an Editorial Staff Consisting of the President and Executive Committee, President-Elect and an Editor-in-Chief. Dr. Grace N. Kimball, Poughkeepsie, N. Y., was appointed Editor-in-Chief.

The Bulletin, which was published quarterly last year, will be continued as the Official Organ of the Association and sent to all members of the M. W. N. A.

An amendment to the Constitution was passed, providing for Group Membership. This was in response to proposals for Federation made last year by certain State societies of Medical Women. Under the Group Membership Amendment, organizations of women whose basis of membership conforms to that of the M. W. N. A., viz., Membership in the A. M. A., may join the National as Group Members: Kansas State Medical Women's Society; New York State Medical Women's Society; Connecticut State Medical Women's Society; Portland, Ore. State Medical Women's Club affiliated through their representatives at the San Francisco meeting.

The Nebraska, Los Angeles and New England Medical Women's Societies signified their desire to take action regarding affiliation.

The M. W. N. A. had a most interesting scientific and educational exhibit, at San Francisco, showing the work of the American Women's Hospitals in Greece and Serbia. Twenty hospitals and a large number of dispensaries are being run by this committee of the M. W. N. A. in Greece alone, under the directorship of Dr. Mabel Elliott, New York Headquarters, 637 Madison Ave., New York; Dr. Esther P. Lovejoy, Executive Secretary.

Four periods on the A. M. A. Moving Picture Theater were assigned to the National—a film of work in Greece, Crete and the quarantine Work on Macronessi Islands, shown by Dr. Esther Lovejoy; and slides of Hospital and Surgical work in Serbia. under Dr. Etta Gray.

Dr. Kate Campbell Mead, of Middletown, Conn., was installed as President. Dr. Katherine C. Manion, of Port Huron, Mich., was chosen President-Elect. Other officers are: vice-presidents, Dr. Martha Welpton, San Diego, Dr. Marjory J. Potter, San Diego, and Dr. Florence W. Duckering, Boston, Mass.; secretary, Dr. Jessie W. Fisher, Middletown, Conn.; treasurer, Dr. L. Rosa H. Gantt, Spartanburg, S. C.

The 1924 annual meeting of the Medical Women's National Association will be held in Chicago, Ill.

The Truth About Medicine

In addition to the articles enumerated in our letter of May 29th, the following articles have been accepted:

Abbott Laboratories
- Amidopyrine-Abbott.
  - Amidopyrine-Abbott Tablets, 5 Grains.
- Epinephrin Chloride Solution-Abbott.

General Chemical Co.
- Sofos.

Eli Lilly & Co.,
- Iletin (Insulin-Lilly)
  - Iletin (Insulin-Lilly) H-10:5 Cc. Ampules.
  - Iletin (Insulin-Lilly) H-20:5 Cc. Ampules.

Powers-Weightman-Rosengarten Co.,
- Sulpharsphenamine Billon
  - Sulpharsphenamine Billon, 0.1 Gm. Ampules.
  - Sulpharsphenamine Billon, 0.2 Gm. Ampules.
  - Sulpharsphenamine Billon, 0.3 Gm. Ampules.
  - Sulpharsphenamine Billon, 0.4 Gm. Ampules.
  - Sulpharsphenamine Billon, 0.5 Gm. Ampules.
  - Sulpharsphenamine Billon, 0.6 Gm. Ampules.

NEW AND NONOFFICIAL REMEDIES.

Insulin.—An aqueous solution of an active principle from pancreas which effects sugar combustion. The strength of insulin is expressed in "units," one unit being one-third of the amount required to lower the blood sugar below 0.045 per cent. and cause convulsions in a rabbit weighing 2 kg., which has been previously starved for twenty-four hours. The administration of insulin to diabetic dogs and to man in severe cases of diabetes mellitus restores to the body the lost ability to oxidize carbohydrate, and glycogen is again stored in the liver. If insulin is administered at suitable intervals to a person suffering from diabetes mellitus, the blood sugar is maintained at a normal level and the urine remains free of sugar. Fat is also burned and, as a result, ketone bodies do not appear in the urine and diabetic acidosis and coma are prevented. The administration of insulin is indicated in cases of diabetes mellitus which cannot be controlled satisfactorily by dietetic treatment. Overdosage of insulin is followed by the development of serious symptoms which demand immediate treatment. Insulin is administered subcutaneously one, two or three times a day before meals. The dosage required to reduce the blood sugar to the normal level must be established for each patient by determination of the blood sugar before and after administration of insulin. In cases of coma or severe acidosis, an initial dose of 15 or 20 units of insulin may be given, followed at 3 to 4 hour intervals by smaller doses with simultaneous administration of glucose.

Insulin-Toronto.—A brand of insulin. It is marketed in 5 Cc. vials containing 10 units in each Cc., and in 5 Cc. vials containing 20 units in each Cc. Connaught Antitoxin Laboratories of the University of Toronto, Toronto, Ontario, Canada.

Quinine Ethyl Carbonate.—The quinine ester of ethyl carbonic acid. Quinine ethyl carbonate was first introduced as euquinine. It is used in place of quinine sulphate and similar soluble quinine salts when a practically tasteless quinine compound is preferred.

Quinine Ethyl Carbonate—M. C. W.—A brand of Quinine Ethyl Carbonate—N. N. R. Mallinckrodt Chemical Works, St. Louis, Mo. (Jour. A. M. A., June 2, 1923, p. 1617).

Arsphenamine-Mallinckrodt.—A brand of arsphenamine—N. N. R. (See New and Nonofficial Remedies, 1923, p. 46). It is marketed in ampules containing, respectively, 0.1 Gm., 0.2 Gm., 0.3 Gm., 0.4 Gm., 0.5 Gm., 0.6 Gm. and 1.0 Gm. Mallinckrodt Chemical Works, St. Louis, Mo.

Barbital—M. C. W.—A brand of barbital—N. N. R. (See New and Nonofficial Remedies, 1923, p. 62). Mallinckrodt Chemical Works, St. Louis, Mo.

Cinchophen—M. C. W.—A brand of cinchophen—N. N. R. (See New and Nonofficial Remedies, 1923, p. 90). Mallinckrodt Chemical Works, St. Louis, Mo.

Mercuric Cyanide—M. C. W.—A brand of mercuric cyanide—N. N. R. (See New and Nonofficial Remedies, 1923, p. 194). Mallinckrodt Chemical Works, St. Louis, Mo., (Jour. A. M. A., June 16, 1923, p. 1775).

Iletin (Insulin-Lilly).—A brand of insulin. (See Jour. A. M. A., June 2, 1923, p. 1617). It is marketed in 5 Cc. ampules containing 10 units in each Cc. and in 5 Cc. ampules containing 20 units in each Cc. Eli Lilly & Co., Indianapolis, Ind. (Jour. A. M. A., June 23, 1923, p. 1851).

Amidopyrine-Abbott.—A brand of amidopyrine—N. N. R. (See New and Nonofficial Remedies, 1923, p 250). It is marketed in substance and in 5 grain tablets. Abbott Laboratories, Chicago, Ill.

Epinephrin Chloride Solution—Abbott.—A solution containing epinephrine chloride, equivalent to 1 part of epinephrine in 1,000 parts of physiological solution of sodium chloride, preserved by the addition of benzoic acid and saturation with carbon dioxide. For a discusson of the actions, uses and dosage of epinephrine, see New and Nonofficial Remedies, 1923, p 112. Abbott Laboratories, Chicago, Ill. (Jour. A. M. A., June 30, 1923, p. 1910).

PROPAGANDA FOR REFORM

Calcium Therapy in Tuberculosis.—From a review of the literature, Maver and Wells concluded that there is no convincing clinical evidence of the value of calcium administration in tuberculosis. They believe that no deficiency in blood calcium exists in tuberculous patients. From carefully controlled animal experiments these investigators conclude that calcium administration does not affect the course of tuberculosis in animals. If the use of calcium compounds in the treatment of tuberculosis is to be continued, clinical experiments of a scientific character should be conducted. At the present time there appears to be no scientific basis for the use of calcium in tuberculosis. (Jour A. M. A., June 2, 1923, p. 1619).

Progress and Conservatism in Therapeutics.—The Committee on Therapeutics of the Council on Pharmacy and Chemistry has published a communication calling attention to two books which physicians should have—New and Nonofficial Remedies and Useful Drugs. It is explained by the Committee that for eighteen years the Council has done its utmost to bring before the medical profession the truth concerning the new proprietary medicinal preparations which are being offered to the profession. The work and functions of the Council are discussed, and it is explained that while the Council was organized primarily to put a stop to the exploitation of proprietary medicines under false claims and the use of secret preparations, its activities have broadened until its work may now be characterized as a "propaganda for the rational use of drugs." The communication concludes: "New and Nonofficial Remedies" and "Useful Drugs" together furnish information concerning all drugs, old and new, which are at present essential to, or give promise of value in, the practice of medicine. They have been compiled with a special object in view, namely, to meet the needs of the student and practitioner of today. The report is signed by C. W. Edmunds, M. D., Professor of Materia Medica and Therapeutics, University of Michigan, Ann Arbor, Mich., John Howland, M. D., Professor of Pediatrics, Johns Hopkins University, Department of Medicine, Baltimore, Md., Ernest E. Irons, M. D., Ph. D., Associate Professor of Medicine, Rush Medical College, Chicago, Ill.; W. T. Longcope, A. B., M. D., Professor of Medicine, Johns Hopkins University, Department of Medicine, Baltimore, Md.; G. W. McCoy, M. D., Director Hygienic Laboratory, U. S. Public Health Service, Washington, D. C.; W. W. Palmer, B. S., M. D., Bard Professor of Medicine, College of Physicians and Surgeons, Columbia University, New York City; Francis W. Peabody, M. D., Professor of Medicine, Medical School of Harvard University, Boston, Mass.; L. G. Rowntree, M. D., Sc. D., Professor of Medicine, Mayo Foundation, Rochester, Minn. (Jour. A. M. A., June 2, 1923, p. 1635).

Book Announcements

International Clinics. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles by Leading Members of the Medical Profession Throughout the World. Edited by HENRY W. CATTELL, A. M., M. D., Philadelphia, with the collaboration of others. Vol. II. Thirty-Third Series, 1923. Philadelphia and London. J. B. Lippincott Company. This volume contains papers on Insulin, on Medical Diagnosis and Treatment, and Surgey. Cloth. 304 pages.

Recovery Record. For use in Tuberculosis. By GERALD B. WEBB, M. D., Consulting Physician Cragmor, Glockner, and Sunnyrest Sanatoria; President Colorado School of Tuberculosis, Colorado Springs, Col., etc., and CHARLES T. RYDER, M. D. Colorado School of Tuberculosis, Colorado Springs, Col. New York. Paul B. Hoeber, Inc. 1923. 79 pages of text divided into four chapters, following which are 108 chart sheets. 12mo. Semi-flexible cloth. 195 pages (2 years' record), $2.00 net. Postpaid on receipt of price.

Physiotherapy Technic. A Manual of Applied Physics. By C. M. SAMPSON, M. D., Formerly of the Physiotherapy Service, Walter Reed, U. S. A. General Hospital, Washington, D. C.; Formerly Chief of Physiotherapy Service and in Charge of Reconstruction Work at Several U. S. A. Hospitals. St. Louis. C. V. Mosby Company, 1923. 443 pages with eighty-five illustrations. 8vo. Cloth. Price $6.50.

Virginia Medical Monthly

FOUNDED BY LANDON B. EDWARDS, M. D., APRIL, 1874.
OWNED BY THE MEDICAL SOCIETY OF VIRGINIA.
PUBLISHED BY THE PUBLISHING COMMITTEE.

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All correspondence regarding editorial matters, articles, advertisements, subscription rates, etc., should be addressed to the Journal.

All advertisements are received subject to the approval of the Council on Pharmacy and Chemistry of the American Medical Association.

Subscription Price: $2.00 per annum in advance.
Single Copies 20c.

Vol. 50 AUGUST, 1923 No. 5

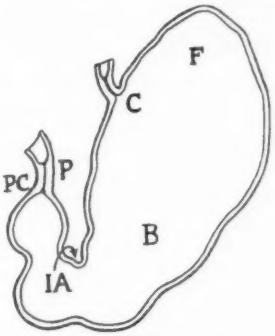
Editorial

The Slow Emptying Stomach.

The stomach is the repository, for a brief period, of the swallowed food taken daily into the body. Upon this organ devolves the duty of mixing and dissoving this food, and initiating the processes of digestion of it and, more or less promptly, discharging it into the intestines. While it is important that ingested food products taken in daily shall remain in the stomach and receive the treatment of mixing and partial digestion, so necessary for its physiological breaking-down into assimilable elements, it is equally important that ingested food products shall not remain in the stomach for "too long a time." The stomach may be injured functionally by such a misuse of it.

The mechanism of stomach function is better understood as one recalls the anatomical divisions of it. The stomach is divided into the cardiac and the pyloric portion by an indentation in lesser curvature known as incisura angularis. The cardiac end is subdivided into the (1) fundus (that portion lying "north" of a line horizontally through the cardiac orifice), and into the (2) "body of the stomach" (that portion between the fundus and the incisura angularis). The pyloric end of the stomach is divided into three parts: (1) the pyloric vestibule, (2) the antrum, (3) pyloric canal.

The steps in the mechanical unloading of the filled stomach may be stated in this way. Peristaltic waves originate about the middle of the body of the stomach and travel toward the pylorus. The fundus region remains free of peristaltic wave-movement, but is the seat of a tonic contraction which maintains a constant pressure upon the food-content, delivering it to the pylorus with a steady force until the fundus is empty. This motor phenomenon of the



Schematic outline of the stomach. At C is the cardia; F, fundus; IA, incisura angularis; B, body; PC, pyloric canal; P, pylorus. The antrum is the portion from IA to PC inclusive. (From Cannon.) (See Physiology and Biochemistry in Modern Medicine, Macleod.)

stomach is an essential one in the emptying of food into the intestines. Without adequate motor power the stomach fails to empty itself and the partially digested food undergoes a fermentative and putrefactive change in spite of its pepsin-hydrochloric acid digestion.

In connection with this one may briefly consider the control of the pyloric sphincter. It seems necessary to modify views elaborated by Cannon that the pylorus is controlled by the acidity of chyme alone. Now, it seems that the control of the pylorus rests upon the "magnitude of the antral contractions." Chyme passes into the duodenum during gastric contraction and coincides with the peristaltic waves traveling over the stomach. The waves in their course over the stomach show varying degrees of contraction and relaxation. The time elapsing between phases of relaxation in the wave is spoken of as a gastric cycle. Stomachs vary in gastric cycles. Some waves are one, two, three or four cycle types of gastric cycles. The four cycle is the most common type of peristalsis. A gastric cycle requires two to three seconds and a four cycle peristalsis requires eight to twelve seconds. When the peristaltic wave, beginning in the body of the stomach and traveling toward the pylorus, reaches the antrum, the sphincter relaxes and the contents are propelled into the pyloric opening. The sphincter relaxes in response to every peristaltic wave

arriving at the antrum and apparently does so blindly, without regard to the reaction of the gastric or duodenal contents, says Macleod, although, no doubt, other factors than peristalsis enter into the emptying of stomach chyme into the pylorus.

Wheelon and Thomas' work in connection with observations made on the relationship between the activities of the duodenum below the "reservoir cap" and the movements of the antrum and pyloric sphincter is interesting. It was found that the duodenum enters upon its positive phase two and a half seconds after the commencement of the sphincter contraction and at the moment the antrum relaxes. It remains relaxed throughout the sphincter and duodenal contractions.*

Conditions Influencing the Emptying of The Stomach.

It is known that the consistency of the foods does not have a very great effect upon the emptying of the stomach. Experiments upon the time required for certain foods to get out of the normal stomach show that there is considerable variation. For instance, the raw egg evacuates in a short time, in less than two hours, while the beef steak may be four hours in evacuating.

The presence of a considerable amount of gas, generated in stomachs as a result of dysfunction or indigestion of the food, and accumulating in cardia, markedly delays the emptying time of the stomach. This may result from the pneumatic pressure upon the stomach musculature which interrupts the peristalsis and eventuates in gastric atony, dilatation and ptosis.

The emptying time of the stomach is influenced by the secretory function indirectly but directly by the motor-function. The term atony applies to that want of power in the musculature to promptly and completely mix and evacuate food received in a normal meal. This condition is due, as above stated, to the failure of peristaltic waves arising in the body of the stomach and traveling to the pylorus, to generate enough force to empty the stomach of its contents. This is not ptosis. There may be and there usually is some dilatation of the organ, which results from the fatigue factor in muscle structure of the stomach wall. Hence, we may have to deal with not only a slow emptying stomach (atonic) but also a dilated one. Such a stomach may, in addition to the factors of atony and dilatation, become displaced downward (ptosed). In such a fasting organ, the "succussion splash" is quite pathognomonic of ptosis without power to empty completely. The effort to make a line of delineation is of little practical importance, because in both instances the evacuating or emptying function is embarrassed and the organ is crippled.

The capacity of the stomach may be taxed by overloading. The meal may be a mixed one of meat, vegetables and sweets, with fluids. The stomach begins its peristaltic wave action in the body of the organ; the cardiac section fixes its muscular contractions upon its gas and fluid contents; slowly through the course of two to four hours, performing thousands of microscopic muscular contractions and four to five hundred expusive wave contractions toward the pylorus, the mixed contents of meat, potato, salads, pies, sweets, coffee and what not, are gradually propelled toward and expelled through the pyloric outlet. So, continued and habitual overloading or dietary indiscretions begin to bring about a weary, atonic musculature. There may be and there usually is secretory disturbance also. Besides, there may be stomach atony with slow emptying function in patients suffering from general muscular weakness from long-standing general diseases, as anemia, syphilis, tuberculosis and diabetes mellitus; in persons who fail to take proper physical exercise or persons who lead sedentary lives.

Actual gastroptosis alone, without splanchnoptosis, is rare. But it does not matter whether or not the cardia actually leaves its upper attachments alone or in association with other viscera. The fact remains that the "deeps" of the stomach descend in such instances to the "pit" of the pelvis and the daily load place in this reservoir is not evacuated or emptied, except tardily. This is the important desideratum. For it has been known that not all ptosed stomachs lack the power of evacuation. The position of the stomach is not the criterion for judgment of stomach function, but its power to evacuate its load is the real test of function. Physicians may look with keener interest upon the emptying function of the stomach as a measure for judging of its motor func-

*Macleod, pages 484-495. Physiology and Biochemistry in Modern Medicine.

tion rather than upon the location of the loaded organ.

Indications of Slow Emptying Stomachs.

Delayed evacuation is indicated by the usual signs of gastric indigestion. Not enough attention is given to the complaints of so-called "dyspepsia." "Dyspepsia" means stomach misfunction. One of the earliest of these dysfunctions is tardy gastric evacuation. A slowing of gastric emptying kicks up discomfort. The appearance of eructations after taking a meal is a symptom of it. The cardia, ballooned with gas, indicates impaired gastric motility as it may gastric secretory disturbance. The sense of fullness and dragging over the upper abdomen, heart-burn, and regurgitation of food, point to impairment of physiologic action in the stomach and may be positive evidence of the delayed evacuation, associated possibly with chronic gastritits, gastric dilatation and gastric ptosis.

In connection with these signs there are frequently signs of systemic disturbance, such as dizziness, morning headache, mental sluggishness (biliousness), melancholia, insomnia and physical weakness. Such patients are rarely free of other and associated morbid processes, which may enter more or less into the etiology of the gastric dysfunction under consideration. From the history of "stomach cases," one may sense often the associated pathology. Is it not singular how true to form the story of "gastric ulcer," "gastric cancer," "gastritis," "gall tract," and "the appendix" case comes out in the "bill of complaints?"

Every history that suggests the signs of gastric pain, nausea, heart-burn, belching, heaviness, oppression, and cardiac or respiratory disturbances following a meal, should receive a careful consideration from the point of view of gastric function and its associated early and late morbid pathology. Every "chronic stomach case," as every "chronic eye case," or other sort of chronic case, should be carefully studied as a whole. The patient should receive, if possible, a systematic general physical examination. This should be done with the patient in position for such complete general physical examination that is free of the encumbrance of clothing, with all due regard for the amenities of life, particularly modesty. Clothing, and the failure to use a good head mirror, or a good light, is often the cause of the errors of diagnosis. A body carefully inspected "from head to foot," by an observing physician, is very much more liable to receive accurate judgment than one covered or only seen in sections. An examination in standing position is as important as one in the recumbent position.

Indications of a slow emptying stomach are readily confirmed by the stomach tube and X-ray examinations, as well as by inflation of the stomach with gas, with a Seidlitz powder, or by eliciting the succussion splash of a so-called "fasting stomach." If a stomach, for instance, six hours after an average meal, gives such evidence of immobility as the production of the splashing sound, referred to, one may conclude that there is evidence of improper function.

Intubation.

The introduction of a tube into the stomach is not difficult. It is not done often enough. The patient is often at fault, because few people there are who do not dislike the thought of "gagging" and nausea. Such an attitude subconsciously reacts upon the practitioner. The examination of the stomach contents, either after the so-called *test meal* has been given or the contents of a stomach that has been fasting for six hours, often may give evidence of the nature of the stomach complaint before gross morbid anatomy has been established. Were intubation done oftener in cases of "dyspepsia" or stomach cases, the probabilities are that the gross and terminal pathology with which we have to deal now would be prevented. The ideal method for the study of gastric function is by the fractional gastric method. This small tube tip can be "swallowed" easily. The patient, with a little instruction, can readily swallow the tube and "feed" it into the stomach. The material obtained should be examined as to (1) quantity; (2) length of time in the stomach; (3) degree of digestion, early and late; (4) the color, odor, general appearance of samples at various aspirations during the intubation: (5) total acidity, free acidity; (6) food retention; (7) microscopic examination; (8) blood; (9) pus; (10) mucus; (11) bile; (12) bacteria.

In the field of motor function of the stomach, one should remember that the Ewald test is evacuated, *in health*, in two to two and a half hours. In other words, an Ewald test meal should not get out of the stomach before two hours, or after two and a half hours after taking. If evacuated in an hour and a half,

there is hypermotility, and, if retained more than two and a half hours, there is hypomotility, or slow emptying power.

As one recalls the grouping of hypermotility cases into (1) achylia gastrica, (2) scirrhous carcinoma with patulous pylorus, (3) a small proportion of cases of duodenal ulcer, (4) those due to function (nervous) hyperperistalsis incident to examination, so one must classify the hypomotility cases in two general groups: (1) association with early digestive disturbances (dyspepsia and those with muscular atony, dilatation and ptosis), (2) true obstruction—blocking pathology.

News Notes

Virginia State Board of Medical Examiners.

At the June meeting of the Board, in Richmond, sixty-six doctors were licensed to practice in this State, fifty-seven by examination and nine by reciprocity. It is announced that this is the largest number to be licensed by the Board since 1914.

Those licensed by examination are:

Dr. Bolling Jones Atkinson, Johnston-Willis Sanatorium, Richmond.

Dr. Emerson M. Babb, Stuart Circle Hospital, Richmond.

Dr. W. H. Batte, Jr., Retreat for Sick, Richmond.

Dr. Benj. F. Bailey, Ft. Defiance, Va.

Dr. Wyatt S. Beazley, Jr., St. Francis Hospital, Jersey City, N. J.

Dr. John A. Blakeney, New York City.

Dr. Wm. P. Bittinger, Johnston-Willis Sanatorium, Richmond.

Dr. Jos. E. Burns, City Hospital, New York City.

Dr. E. P. Cardwell, Wilmington, N. C.

Dr. William E. Chapin, Richmond.

Dr. Fielding Combs, City Hospital, New York City.

Dr. John G. Davis, Jr., Roanoke, Va.

Dr. Saml. W. Eason, Jersey City Hospital, Jersey City, N. J.

Dr. Monroe Jacob Epting, Jr., St. Luke's Hospital, New York City.

Dr. Richard T. Ergenbright, City Hospital, Worcester, Mass.

Dr. Rowland H. Edwards, Memorial Hospital, Richmond.

Dr. Percy R. Fox, Retreat for Sick, Richmond.

Dr. Benjamin E. Glass, Muhlenberg Hospital, Plainfield, N. J.

Dr. Samuel J. Goldfain, Richmond.

Dr. Joseph T. Graham, St. Luke's Hospital, Richmond.

Dr. W. S. Grambling, Craig Healing Springs, Va.

Dr. Benjamin F. Haskell, Philadelphia.

Dr. Frank E. Handy, Toms Creek, Va.

Dr. Rogers N. Harris, St. Luke's Hospital, Richmond.

Dr. Robt. P. Hawkins, Jr., C. & O. Hospital, Clifton Forge, Va.

Dr. Frank Helvestine, Jr., Roanoke, Va.

Dr. Robt. Battaile Hiden, Pungoteague, Va.

Dr. Clack D. Hopkins, Flushing Hospital, New York City.

Dr. Humie Z. L. Horton, Apex, N. C.

Dr. Wm. B. Hubbard, Broadway, Va.

Dr. Robt. S. Kyle, Woodlawn, Va.

Dr. Estes Caskie Kidd, Nelson County, Va.

Dr. Robt. Bruce Lawrence, Richmond.

Dr. Lee S. Liggan, Memorial Hospital, Richmond.

Dr. Eugene L. Lowenberg, Lenox Hill Hospital, New York City.

Dr. Homer B. Luttrell, Amissville, Va.

Dr. Thomas Hodge McGavach, Waterford, Va.

Dr. John A. Mease, Jr., Memorial Hospital, Richmond.

Dr. John W. McNabb, Belleville, Pa.

Dr. Henry H. Menzies, Retreat for Sick, Richmond.

Dr. Edwin Raymond Mickle, Philadelphia General Hospital, Philadelphia.

Dr. Phil Hawkins Neal, Gouverneur Hospital, New York City.

Dr. Waverly R. Payne, Elizabeth Buxton Hospital, Newport News, Va.

Dr. Clarence E. Perkins, Northwestern General Hospital, Philadelphia.

Dr. Louis Perlin, Memorial Hospital, Richmond.

Dr. Fred F. Oast, Portsmouth, Va.

Dr. Miles P. Omohundro, Charlottesville, Va.

Dr. William I. Owens, Lenox Hill Hospital, New York City.

Dr. Russell W. Roberts, Faber, Va.

Dr. J. Churchill Robertson, Long Island Hospital, Brooklyn, N. Y.

Dr. Harry T. Schiefelbein, New Libson, Wis.

Dr. David L. Strader, St. Charles, Va.

Dr. Leta J. White, Memorial Hospital, Richmond.
Dr. Ernest M. Wilkinson, Stuart Circle Hospital, Richmond.
Dr. John Powell Williams, St. Luke's Hospital, New York City.
Dr. Richard L. Willis, New York City.
Dr. Archer A. Wilson, Oxford, N. C.
Those licensed by reciprocity are:
Dr. Nat. H. Copenhaver, Rochester, Minn.
Dr. Francis A. Georger, Warrenton, Va.
Dr. Hannes Inberg, Warren, Ohio.
Dr. Kenneth E. Lowman, Norfolk, Va.
Dr. Seab A. Tuck, Eggleston, Va.
Dr. George Penn Dillard, Draper, N. C.
Dr. Walter L. Hogan, New York City.
Dr. George Richardson Joyner, Suffolk, Va.
Dr. Thos R. O'Rourk, Norfolk, Va.

Ladies Especially Invited to Attend the Meeting of the State Medical Society Which Will be held in Roanoke, October 16th-19th.

The Entertainment Committee wishes particularly to announce that an especial feature of the meeting of the State Medical Society this year will be plans for the entertainment of the ladies.

It will be recalled that a Ladies' Auxiliary was organized at the Norfolk meeting with Mrs. R. L. Williams of Norfolk as President and Mrs. Sparrell Gale of Roanoke as Vice-President. It is planned that as a preliminary to the future activities a meeting of the Auxiliary will take place at Hotel Roanoke on Wednesday morning, the second day of the meeting of the Society.

The Ladies' Entertainment Committee of Roanoke are at present busy with tentative plans which, among other things, include visits to points of interest in and around Roanoke, such as Hollins College, Virginia College, Roanoke College, a trip up the Mill Mountain Incline, and last but not least a trip to the Catawba Sanatorium, and a barbecue and entertainment at Lakeside.

The officers of the State Board of Health and of the Sanatorium have been good enough to include all members of the Society and visiting ladies in the invitation to visit Catawba. Likewise Dr. Everett Watson of Salem has kindly invited all to visit and inspect Mt. Regis Sanatorium.

It is now planned that early in the afternoon of Wednesday, following the Scientific program of the morning, automobiles will leave Roanoke by the way of Salem, visiting Mt. Regis and going directly to Catawba. A splendid macadam road is now nearing completion the entire distance which, as those who have previously made the trip will attest, leads through beautiful and rugged mountain scenery which will be at its best in October.

If it be found agreeable to the Scientific Program Committee, it is planned to group such papers as may deal with Tuberculosis and kindred subjects and present them at the Sanatorium along with such demonstrations and other matters of interest as doubtless will be presented by the physicans of the Sanatorium.

Dinner will be served at the Sanatorium in ample time for the return trip to Roanoke and the resumption of the Scientific Program of the evening, following which a dance will be tendered.

While the complete plans for the barbecue and entertainment at Lakeside on Thursday have not been worked out, the Committee promises that it will not be lacking in features of interest. Following the barbecue the ladies will be entertained by a musical at the Country Club.

Ladies make your plans to come to Roanoke and enjoy a splendid outing!

Open Letter to the Doctors of Virginia.

1110 Capitol Street,
Richmond, Va.,
July 27, 1923.

There have been in Virginia a large number of cases of illness presenting the following characteristics:

Acute onset with severe epigastric pain which may extend later to one or both sides of the lower portion of the thorax. The pain is described as very severe, as cutting or as cramp-like. The pain is increased by deep breathing so respiration is shallow and rapid. A rate of 60 per minute has been noted. An expiratory grunt is frequently observed.

The temperature is usually 100 and 102, pulse 80 to 100. The patient looks very ill. The face is pinched or moderately cyanosed.

Constipation is the rule and abdominal distention is frequent.

The most severe symptoms are at the time of onset and last from four to twenty-four hours. The duration of acute illness is seldom more than five days but slight elevation of temperature may continue for three weeks.

The condition affects children and adults but is more common in the former. It spreads through families in the manner of a contact infection. There have been no deaths but a few cases have been followed by serious illness of some other type.

The condition is apparently an undescribed communicable disease now occurring as an epidemic. This description is issued so that you may be on the lookout for it in your practice. If it occurs or has occurred in your practice, please notify us of the number of cases and the date when your first case was seen.

ENNION G. WILLIAMS, M. D.
State Health Commissioner and Collaborating Epidemiologist, U. S. P. H. S.

Attention, Doctors!

The above communication from the State Health Commissioner, Dr. Ennion G. Williams, explains itself. As a matter of interest to the profession, in addition to reporting your cases, as requested by Dr. Williams, it will be hepful to have an expression of opinion from our readers as to their treatment of these cases, with results obtained.

Re-Organization of the Professional Activities of the Free Dispensary and the Hospital Division of the Medical College of Virginia.

The Medical Staff of the Hospital Division of the Medical College of Virginia was completely reorganized during September, 1922, and the professional activities in the Dooley Hospital for white chidren under ten years of age, the Memorial Hospital for the white patients over ten years of age, and the Saint Philip Hospital for negro patients, which hospitals are owned and controlled by the Medical College of Virginia, have been carried on by the reorganized Medical Staff, since that time. The Medical Staff is organized in the following manner:

The Administrative Committee of the Medical Staff comprises the Dean of the Faculty of the School of Medicine as Chairman, the Superintendent of the Hospital Division as Secretary, and the following professors of the School of Medicine of the College who, co-incident with their election, are appointed by the Executive Committee of the Board of Visitors as heads of the departments indicated: Professor of Medicine as Physician-in-Chief; Professor of Surgery as Surgeon-in-Chief; Professor of Obstetrics as Obstetrician-in-Chief; Professor of Pathology as Pathologist; Professor of Roentgenology as Roentgenologist.

The Administrative Committee of the Medical Staff meets once each week at the Memorial Hosital, and thoroughly canvasses and discusses the various professional activities carried on in the Hospital Division. It is empowered to make, promulgate and enforce rules and regulations governing the professional and teaching work in the Hospitals, subject to the approval of the Medical Staff.

The Medical Staff is selected from the Faculty of the School of Medicine of the College, and is elected annually in June by the Executive Committee of the Board of Visitors. The personnel is nominated by the Chiefs of Departments represented on the Administrative Committee of the Medical Staff, upon the recommendation of the heads of the various divisions and services established in the Hospital Division, who are the heads of corresponding Divisions on the faculty of the School of Medicine of the College. They are known as Physicians and Surgeons, and Associate Physicians and Surgeons.

The Assistant Medical Staff is selected from the faculty of the School of Medicine of the College, and is elected annually in July by the Executive Committee of the Board of Visitors upon the recommendation of the Medical Staff. They are known as Junior Physicians and Surgeons.

The medical and surgical treatment of patients occupying beds in the wards of the hospitals, irrespective of whether their expenses are paid by the City, by the State, or by themselves, is directed and supervised by the group from the Medical Staff organized for that purpose. Physicians and surgeons are not permitted to charge or receive a fee or emolument for services rendered to Ward Patients, and arrangements have been made to accommodate in private rooms at a moderate charge patients debarred from the Wards on account of this ruling. Patients occupying beds in the Wards of the Hospitals, who are able to pay for the care and treatment rendered, are charged $2.50 per day, which is in full for all examinations and treatment necessary, there being no extra charges whatever.

All reputable physicians and surgeons in Richmond have full privilege to treat patients occupying private rooms in any of the hos-

pitals, including the use of the operating rooms.

On July 1, 1923, the Free Dispensary, heretofore maintained by the Medical College of Virginia as a separate department, became the "Out-Patient Department" of the Hospital Division, and its affairs both administrative and professicnal will from that time on be directed and supervised by the officials of the Hospital Division. The Medical Staff of the Out-Patient Department will be selected from the personnel of the Medical Staff and Assistant Staff of the Hospital Division. Appointment on the Medical Staff and Assistant Staff of the Hospital Division carries with it an obligation to serve on the Medical Staff of the "Out-Patient Department" in the corresponding Division or Service. This will bring about a closer co-ordination of the work of caring for and treating patients in the various Departments, as physicians and surgeons treating patients in the Hospitals may, on the discharge of the patient from the Hospital, refer the patient to the Out-Patient Department for continued observation and minor treatment, under their direction and supervision. Likewise, patients applying to the Out-Patient Department for treatment, and requiring to be admitted to the Hospital, may be observed and in many instances treated by the physician or surgeon first seeing the patient in the Out-Patient Department.

Included in the program of enlargement of the Medical College of Virginia is a building seven floors in height, the first three floors to be used exclusively by the Out-Patient Department, and the other four floors to be used by the Pathological Laboratory and related activities.

Woman's Auxiliary.

Members of the Woman's Auxiliary of the Medical Society of Virginia will be much interested in the report given on page 335, this issue, by their delegate, Mrs. J. Allison Hodges, of Richmond. Only three of our Virginia members were represented at the San Francisco meeting of the National Woman's Medical Auxiliary, but we count on larger attendance next year, as the members of the Virginia Auxiliary become more interested in the work.

In San Francisco, entertainments were arranged for the ladies every day and these, with the many points of interest to be visited, added very greatly to the enjoyment of those who attended. The crowning event, perhaps, was the visit to the beautiful Stanford University, including the organ recital and the reception at the home of President and Mrs. Ray Lyman Wilbur.

Report on Alcoholism in Virginia.

Dr. W. A. Plecker, Director of the Virginia Bureau of Vital Statistics, replying to an inquiry from the World League Against Alcoholism, London, as to the effect from a medical standpoint of prohibition in this country, states that much good has already been accomplished since the State prohibition law went into effect. Without reference to the improvement in the moral conditions among the working class, there has been a gradual but very decided decrease in deaths from cirrhosis of the liver, showing that chronic alcoholics are gradually decreasing. The chief reason for the present number of deaths attributed to alcohol "is that the stuff now being sold for whiskey is not whiskey, and would have by no means passed the test of former years." The number of deaths in Virginia from alcoholism in 1922 was forty-nine. The first year after the prohibition law went into effect in Virginia (1917), the number of deaths from alcoholism was only twenty, as compared with sixty the preceding year.

Dr. Irving S. Barksdale,

Son of Dr. George E. Barksdale, formerly of Richmond, but now connected with the U. S. Veterans' Hospital, at Oteen, N. C., has been elected professor of physiology in the Medical College of South Carolina, at Charleston. He will enter spon his duties the first of September. Dr. Barksdale graduated from Yale University School of Medicine this year, and his appointment is the indirect result of some research work he has done in the field of medicine. Dr. Barksdale has quite a war record, having seen service on the Mexican border and later in the World War.

Dr. R. M. Gilliam,

Formerly of Newport News, Va., and a graduate of the Medical Department of the University of Virginia in 1919, has been on a visit to Williamsburg, Va.

Dr. and Mrs. R. A. Vonderlehr

Have returned to their home in Richmond, after a visit to friends in Heathsville, Va.

Dr. T. C. Harris,

Recently of Kenbridge, Va., has located in Martinsville, Va., where he is associated with Dr. M. E. Hundley at the Lucy Lester General Hospital.

Dr. Jury B. Loving,

Upon completing his internship at St. Luke's Hospital, Richmond, the first of July, located at 636 North Main Street, Danville, Va.

Dr. William H. Batte, Jr.,

Jarratt, Va., is serving as one of the internes at Retreat for the Sick, Richmond. He is temporarily taking the place of Dr. Samuel P. Hileman, of Rockbridge Baths, who has been quite sick at his home, with meningitis. Both of these doctors graduated from the Medical College of Virginia this June.

Dr. M. Grove-Hagen,

Richmond, left the first of July for a visit to his former home in Norway. He expects to be back about the first of September.

Dr. Ramon D. Garcin,

Richmond, has been named one of the trustees of the Grand Chapter, Royal Arch Masons of Virginia.

Dr. Garcin has also been recently elected a member of the public library board of Richmond.

Dr. and Mrs. A. T. Finch,

Of Chase City, Va., recently attended the reunion of the Bacon family in North Carolina.

Dr. Robert S. Spilman,

Medical officer of the Virginia Military Institute at Lexington, has been the guest of his sisters at their home near Warrenton, Va.

Dr. S. S. Northington

And several friends of South Hill, Va., spent a week in July on a fishing trip at Ocean Park.

Dr. and Mrs. R. L. Hudgins

And little daughter of Farmville, Va., have been among the summer visitors at Virginia Beach.

Dr. M. D.'Arcy Magee,

Washington, D. C., after spending several months abroad, will return home the latter part of September.

Dr. E. L. Flanagan,

Richmond, has returned from New York where he was engaged in post-graduate work in X-ray. He will shortly open offices in the Medical Arts Building.

Dr. William A. McGowan,

Richmond, has been elected a member of the board of directors of the Federal Trust Company, of this city.

Former Virginian Awarded Croix De Guerre.

Information has been received here stating that Dr. Lewis S. Herndon, formerly of Richmond, has been awarded the French Croix de Guerre, with a gilt star. The reward comes as the result of heroic care for the wounded near Soissons, in 1918.

Dr. Herndon graduated from the Medical College of Virginia in 1914 and, after a few months in North Carolina, located in Virginia until he entered the World War. He returned to this country after eighteen months' service, during which time he was wounded, and took post-graduate work at Manhattan and Lying-In Hospitals, New York City. He was for twelve months head of the house staff of the latter hospital. About a year ago he located in Newark, N. J., where he is now specializing in obstetrics.

Dr. and Mrs. John D. Foltz

And children have returned to their home in Richmond after a visit to Buckroe Beach and Ocean View, Va.

Insulin Clinics.

To meet the demand for the insulin treatment of diabetes, special clinics are being held in hospitals in a number of the larger cities in the United States and Canada, to teach physicians in general practice the proper methods of employing the treatment. This instruction is made possible by a large donation by Mr. John D. Rockefeller, Jr.

Chiropractors Must Pass State Board Examination.

We note from the *Journal of the A. M. A.* that chiropractors and other "drugless" practitioners, graduates of mechanotherapy schools, will be granted certificates to practice in the State of Alabama, provided they pass an examination given by the State Medical Examining Board. New regulations require that ap-

plicants be examined in certain branches, among which are anatomy, chemistry, physiologic chemistry, bacteriology and pathology.

Dr. Samuel Newman

Has returned to his home in Danville, Va., and opened offices in Arcade Building. He will limit his practice to diseases of infants and children. Dr. Newman served abroad for twenty months as a member of the Medical Commission of the American Joint Distribution Committee in Poland, Galicia and Ukraine, and for ten months as Volunteer Physician in the Children's Clinic of the University of Vienna.

The American Association of Obstetricians, Gynecologists and Abdominal Surgeons

Will hold its next annual meeting in Philadelphia, September 19, 20 and 21, 1923.

Maj. Herbert C. Mallory, M. C.,

Has been relieved from duty with the Eightieth Division, organized reserves, at Richmond, Va., and will sail from San Francisco, October 23, for the Hawaiian Islands, where he will report to the commanding general of that department for duty with the medical corps.

Department Surgeons for Sons of Confederate Veterans, A. N. V.

Drs. Benjamin L. Hume, Huntington, W. Va., E. Ackley Moore, Marshall, Va., and Lawrence T. Price, Richmond, are among those who have been appointed department surgeons in the Army of Northern Virginia, Sons of Confederate Veterans.

Professor of Pediatrics, University of Virginia.

Dr. Lawrence T. Royster, Norfolk, Va., was elected professor of pediatrics in the University of Virginia, Department of Medicine, at a special meeting of the university board of visitors, held July 13. Dr. Royster will assume his new duties about the first of January, 1924. This is the first time the University of Virginia has had a full time professor of pediatrics, this branch having been included in the course of medicine.

Dr. Royster is recognized as one of the prominent pediatricians of the South and is a member of the American Pediatric Society. He is an alumnus of the University of Virginia, having graduated from its Medical Department in 1897. He will be greatly missed in Norfolk, where he has done a great deal of work in the children's clinics in addition to his private work.

Sanitary Inspectors Trained at the University of Virginia.

The first ten weeks' intensive course for Sanitary Inspectors, held at the University of Virginia, was completed on May 1st. Those completing the course were Miss Mary Lee Helms, of Blacksburg, Va., John Walton Robertson, of Charlotte Courthouse, Va., and Philip Kime, of Salem, Va. All of these students have been appointed to positions as County Sanitary Inspectors, Miss Helms being located at Lebanon, Russell County, Mr. Robertson at Chincoteague Island, Accomac County, and later transferred to Loudoun County, and Mr. Kime having worked for some months in Albemarle County has been transferred to Greene County to control an epidemic of dysentery. All these workers are filling good positions, and their work has been highly commended.

The University of Virginia is offering twelve weeks' intensive course for the training of Heath Officers and ten weeks' course for Sanitary Inspectors. These courses are almost entirely of a practical nature and are conducted in the field, the plan being to give as much practical training as possible in the time required so that those taking the courses can best serve the needs of the State.

Dr. Walter E. Vest,

Huntington, W. Va., in July visited Williamsburg, Va., where he attended a meeting of the board of managers of the William and Mary Alumni Association, of which he is a member.

The Southwestern Virginia Medical Society

Will hold its fall meeting in Abingdon, September 6 and 7. The president, Dr. R. H. Woolling, Pulaski, will deliver his annual address and a most interesting program on medical and surgical subjects has been prepared. A subscription banquet will be held on the evening of the 6th. Dr. E. G. Gill, Roanoke, is secretary-treasurer of this Society.

Dr. Everett A. Lockett,

Winston-Salem, N. C., has been appointed

county physician for Forsyth County, North Carolina.

Dr. Joseph L. Spruill,

Recently of the staff of the N. C. Sanatorium for the treatment of Tuberculosis, at Sanatorium, N. C., beginning September 1, will have charge of the Guilford County (N. C.) Hospital for the Tuberculous.

Dr. and Mrs. C. V. Montgomery,

Family and some friends, of South Hill, Va., have returned home after a motor trip through the Valley of Virginia.

Dr. and Mrs. I. K. Briggs,

South Boston, Va., are home again after a motor trip through New England.

The Sixth (N. C.) District Medical Society,

At its meeting in July, elected Dr. Eric A. Abernethy, Chapel Hill, president, and re-elected Dr. Burton W. Fassett, Durham, secretary.

The American Therapeutic Society,

At its annual meeting in San Francisco, the latter part of June, elected Dr. George H. Evans, San Francisco, president, Dr. Lewis H. Taylor, Washington, D. C., secretary, and Dr. Spencer L. Dawes, New York City, treasurer. Both of the latter were also elected to serve five-year terms on the council.

Dr. and Mrs. Raymond C. Hooker,

Richmond, have been enjoying a motor trip through several of the Southern states.

The American Psychiatric Association,

At its annual meeting in Detroit, the latter part of June, selected Atlantic City, N. J., as the 1924 place of meeting. Dr. Thomas W. Salmon, Larchmont, N. Y., professor of psychiatry at Columbia University, New York, was elected president; Dr. William A. White, Washington, D. C., vice-president; and Dr. Clarence Floyd Haviland, Albany, N. Y., secretary-treasurer.

New State Health Commissioner of New York.

Dr. Mathias Nicoll, of Albany, has been appointed New York State Commissioner of Health, to succeed Dr. Hermann N. Biggs, who died from broncho-pneumonia on June 28. Dr. Biggs was one of the pioneer health workers of this country. Dr. Nicoll has been with the New York State Health Department for the past eight years and for the past four years has been Deputy Commissioner. Prior to that time he was secretary of the department and director of Public Health Education.

Dr. James O. Mathews,

Clinton, N. C., has returned home after several weeks in New York where he was doing post-graduate work. Dr. Mathews has many friends in this section, having graduated from the University College of Medicine, Richmond, 1897. He states that he lives on a farm and is doing a real country practice.

Dr. O. O. Ashworth

Has opened offices in Suite 701, Professional Building, Richmond, for the practice of general medicine. He will move to the Medical Arts Building when it is completed.

Dr. Ashworth was for two years an interne at St. Elizabeth's Hospital, Richmond, and for the past year has been assistant physician at Catawba Sanatorium, Va. He has recently been appointed assistant attending physician to St. Elizabeth's Hospital, Richmond, Dr. William H. Higgins being attending physician and head of the Medical Department there.

Dr. and Mrs. Hugh McGuire,

Alexandria, Va., left the latter part of July for a visit of some length in Nova Scotia.

Dr. Hubert L. Wyatt,

Petersburg, Va., has resigned as a member of the medical corps, Virginia National Guard, for business reasons.

Dr. Hunter McGuire,

Richmond, recently spent several weeks with a patient at Saranac, N. Y.

Dr. and Mrs. Joseph Hume

And daughter, of Norfolk, Va., motored to Old Sweet Springs, W. Va., early in August, to spend the remainder of the summer at that place.

Dr. and Mrs. Thomas J. Kagey,

Newport News, Va., are spending several weeks visiting Alaska.

Dr. Sidney Trattner

Has returned to his home in, Richmond after a visit to New York.

Dr. and Mrs. E. H. Terrell

And daughters, Richmond, are spending some time at Wrightsville Beach, N. C.

Richmonders hurt in Motor Accident.

Dr. Thomas E. Hughes, of Richmond, his brother, Dr. John M. Hughes, a dentist of this city, and their mother suffered a number of bruises and cuts in an automobile collision near Boonsboro, Md., early this month. In spite of their injuries, however, they were able to proceed with their trip.

Dr. P. L. Hill, Jr.,

Of the class of '17, Medical College of Virginia, who has been engaged in medical missionary work in Choonchun, Korea, for the past six years, is now on a furlough in this country. At present he is taking a special course in diseases of the spine at Battle Creek Sanitarium. Dr. Hill expects to return to Korea about the first of December.

Aid to Authors.

To those who are preparing or contemplating the preparation of manuscripts, the information given in the advertisement of the Corona Typewriter, in this issue of the Journal, may prove of interest and service.

By the way, why not look over our advertising pages every month? You will find many things of interest constantly.

Dr. and Mrs. J. N. Elder,

Hopewell, Va., have been on a visit to Mrs. Elder's relatives in Christiansburg, Va.

Dr. Sam Wilson

Returned to his home in Lynchburg, Va., the first of this month, after a visit to his mother in Petersburg, Va.

Acting Health Officer in Petersburg.

Dr. Mason Romaine has been acting as city health officer of Petersburg, Va., during the absence from the city of Dr. R. A. Martin, who has been undergoing treatment at a Richmond hospital.

Dr. Powell Graham Fox,

Who recently completed his term of service as an interne at the Retreat for the Sick, Richmond, has located at 310 Masonic Temple, Raleigh, N. C., where he is engaged in general practice.

Dr. J. B. Dalton,

Richmond, announces the removal of his offices and residence to 1100 West Franklin Street, this city. He has just completed a very attractive building at this place.

Southern Medical Association Meeting.

Plans are being made for a "big" meeting of the Southern Medical Association in Washington, D. C., November 12-15, inclusive, under the presidency of Dr. W. S. Leathers, of University, Miss. The New Willard Hotel will be general hotel headquarters, though the various sections will hold their meetings in other hotels. Mr. C. P. Loranz, secretary-manager of the Association, Empire Building, Birmingham, Ala., will gladly furnish any information requested about this meeting.

Dr. W. E. Dickerson,

A graduate of the Medical College of Virginia in 1922, upon completing his internship at Retreat for the Sick, Richmond, in July, located in Danville, Va., with offices at 563 Main Street.

Dr. George H. Snead,

Of Fork Union, Va., leaves on the 20th of August for New York City, where he will take a post-graduate course in diseases of the eye, ear, nose and throat.

Dr. F. J. Clements,

Cartersville, Va., who graduated from the Medical College of Virginia this June, has located at Fork Union, Va., where he has taken over Dr. Snead's work.

"Have a Health Examination on Your Birthday."

With the above slogan the National Health Council is sponsoring a country-wide campaign for periodic health examinations. The movement has the endorsement of the American Medical Association. A committee of the A. M. A., has prepared forms which may be obtained at cost price from the Association headquarters, 535 N. Dearborn Street, Chicago.

The National Health Council, 370 Seventh Avenue, New York City, has prepared a pamphlet for distribution to the public, two excellent posters, a set of thirty lantern slides with lecture outline included, and a moving picture film. With the exception of the latter, which is available for free distribution, all of the other material is sold at cost price.

The U. S. Civil Service Commission,

Washington, D. C., announces open competitive examination for medical assistant in pharmacology, receipt of applications to close September 11. The examination is to fill a vacancy in the Bureau of Chemistry, Department of Agriculture, and similar positions, at entrance salaries ranging from $3,000 to $3,600 a year.

Applications will be received by the Commission until December 28, for graduate nurse and graduate nurse follow up, to fill vacancies in the Veterans' Bureau and in the Indian and Public Health Services. Competitors will not be required to report for examination at any place, but will be rated on their education, training, and experience, on a scale of 100.

For detailed information apply to the above named Commission.

For Sale.

West Virginia village and country practice and residence; prosperous churches, high school with normal training course, bank, three lodges, rich agricultural section, on class A road. Price $5,000; residence alone worth the price. Address No. 264, care this journal. (Adv.)

Obituary

Dr. Arlington Cecil Jones,

A beloved and prominent physician of Covington, Va., died at his home in that place, July 15, after a lingering illness with Bright's disease. He was born at Doe Hill, Va., in 1871, and, after an academic course at Virginia Polytechnic Institute, studied medicine at the University of Virginia, from which he graduated in 1894. He then served for four years as demonstrator of anatomy at the University of Virginia. In 1899, he located in Covington. He had been a member of the Medical Society of Virginia since 1899. He is survived by his wife, two sons, his father, Dr. H. H. Jones, of Dunmore, W. Va., and a large family connection.

Dr. William Alexander Wilson,

A prominent and beloved physician and citizen of Radford, Va., died June 22, after a long illness, and was buried in Christiansburg. He was born in Pulaski County, Virginia, 71 years ago and studied medicine at the University of Virginia, from which he graduated in 1874. While at the University, he was awarded the medal in chemistry. After this, he practiced for a while with his father, the late Dr. M. A. Wilson, in Puaski. He ministered to the sick in Radford for the past thirty-five years, and had always taken an active part in the civic affairs of the community. He had been a member of the Medical Society of Virginia for a number of years. Dr. Wilson is survived by his wife and one daughter, Mrs. J. L. Early, of Saltville, Va.

Dr. George W. Richards,

Of Island Ford, Va., died August 4, at the age of ninety-six years. He was a graduate of the Medical College of Virginia in 1857, and served as a surgeon with the Confederate army throughout the war between the states. He practiced his profession in East Rockingham and Albemarle Counties for more than fifty years.

Dr. James Reid Sterrett,

Durham, N. C., died June 10, following an operation for abscess of the lung. He was forty-two years of age and a graduate of the University College of Medicine, Richmond, in 1908, at which time he was appointed interne at Richmond City Hospital. He was at one time county physician for Durham County, North Carolina. Dr. Sterrett practiced for several years in Rockbridge County, Virginia and, during his residence in this State, was a member of the Medical Society of Virginia.

Dr. Jacob Andrew Keck

Died at his home in Richmond, Va., July 26, after a long illness. He was forty-eight years of age and studied medicine at the Medical College of Virginia, from which he graduated in 1895. He was at one tine a member of the Medical Society of Virginia.

Dr. William B. Pryor Jones,

A well known homeopathic physician of Petersburg, Va., died July 15. He received his medical degree from Hahnemann Medical College and Hospital of Philadelphia in 1884.

Irvine Cooper, Ph.G.,

Of Norfolk, Va., a member of this year's graduating class in pharmacy at the Medical College of Virginia, was fatally wounded on August 5, when a revolver which was being cleaned accidentally discharged. He died a few hours later, after absolving the man handling the revolver of all blame for the accident. The bullet penetrated his back and emerged through the abdomen.